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# Understanding Factors that Influence the Perceptions of Students who Identify as People of Color towards Choosing Teaching as a Career: A Case Study

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Understanding Factors that Influence the Perceptions of Students who Identify as People of

Color towards Choosing Teaching as a Career: A Case Study

**A Dissertation**

Submitted to the  
Faculty of Kennesaw State University  
Bagwell College of Education  
in partial fulfillment of  
the requirements for the degree of  
Doctor of Education  
Department of Secondary and Middle Grades

By

Ashley L. Deason  
Kennesaw State University  
Kennesaw, Ga  
2020

**Dedication**

I dedicate this dissertation to my family. Thank you for always encouraging and believing in me.

### **Acknowledgments**

There are many people to whom I am grateful for their help during this process. First and foremost, I would like to thank my advisor, Dr. Michelle Head. Since working with her as a GRA, she has provided endless support and guidance. She has encouraged, motivated, inspired, and guided me through the entire process. I am forever grateful for her, and the completion of this dissertation would not have been possible without her support.

I would also like to express gratitude to my committee members Dr. David Buckman and Dr. Brian Lawler. Both of them pushed me to think outside the box to write a truly meaningful dissertation that stands strongly in the realm of education research. Thank you for your valuable feedback and guidance.

I am also grateful to my colleagues who have given me an immense amount of support in my time at Kennesaw State University. I would like to specifically thank Robert Bice; he has read every page of this dissertation, and for that, I am indebted to him. Rob has been a constant beacon of support professionally, academically, and personally. He has not only been a great colleague, but he is also a dear friend. We have been through this entire process together, and I am beyond thankful for his companionship in this journey.

Finally, my deepest gratitude goes to my family and friends. I cannot begin to express how much each heartfelt word of encouragement has meant during this journey. I would specifically like to thank my parents who taught me the importance of education and what it means to have grit and strong work ethic. Also, I would like to thank my sister, Katie Perritt, for continuously pushing me, supporting me, and believing in me. Last, I would like to thank my best friend, Mark Herman, for his endless support in helping me turn my dream into reality.

### Abstract

As the number of STEM jobs available increases, there is an inherent need to better prepare students to fill these roles. More specifically, as the demographics of our nation and classrooms change, it is of utmost importance to make sure students who identify as people of color are prepared and confident in taking on these roles, but current statistics show that this is not happening. One way to combat this need is to increase the number of highly qualified STEM teachers of color in K–12 classrooms as they have been shown to increase the motivation and confidence of students of color. However, in order to do this, we must first explore how people of color who are academically prepared to pursue teaching in a STEM classroom perceive it as a viable career option. Therefore, this research took a case study approach in order to understand how specific experiences of successful STEM students who identify as people of color influence their perceptions of a career as a STEM teacher. Built within the Expectancy Value and Critical Race Theory frameworks, this study first used a survey to holistically understand and compare students' perceptions of teaching and their perceptions of an ideal career. Then, participants were purposefully chosen for interviews that further explored the experiences of these students of color within the bounded case and how these experiences impacted their perceptions of teaching and of an ideal career. Survey results revealed that participants had statistically more negative perceptions of teaching than of their ideal careers, but it was found that freshmen in college had statistically more positive views of teaching than the other education subgroups investigated in this study. In the interviews, participants explained that relationships with teachers were one of the most important influencers in their education experiences, and the institutional racism experienced in school makes them shy away from considering teaching as a career. The findings of this dissertation can be used to inform current literature on how changes can be planned to increase the representation of people of color in STEM classrooms and STEM careers.

*Keywords:* Perceptions of teaching, Students of color's perceptions, FIT–Choice Survey, Expectancy Value theory, Critical Race Theory, Case study

## Table of Contents

Chapter 1: Introduction .....	9
Statement of the Problem .....	9
Justification of Study .....	14
Purpose and Research Questions.....	15
Conceptual Framework .....	18
Local Context .....	18
Organization of Study .....	20
Chapter 2: Literature Review.....	21
Introduction .....	21
Theoretical Frameworks.....	26
Summary and Implications.....	44
Chapter 3: Methodology .....	46
Methodological Framework: Case Study .....	46
Research Questions .....	48
Context of Study.....	50
Participants .....	51
Data Collection.....	53
Data Analysis .....	56
Strategies to ensure Trustworthiness.....	58
Chapter 4: Findings.....	62
Survey Analysis: Comparison of Perceptions .....	62
Interview Analysis: Influence of Experiences on Perceptions of Teaching.....	72
Perceptions of Teaching .....	75
People who Look like Me .....	84
Experiences of People of Color in Educational Institutions .....	86
Synopsis of Secondary Research Questions.....	93
Chapter 5: Conclusions, Implications, and Future Work.....	98
Conclusions .....	99
Limitations .....	102
Implications for Teacher Recruitment.....	102
Future Work .....	105

References .....	107
Appendices.....	138
Appendix 1. Survey .....	138
Appendix 2. Interview Protocol .....	144
Appendix 3. Codebook for Qualitative Data.....	150

**List of Tables**

Table 1. Demographics of Surveyed Participants .....	52
Table 2. Participant GPA by Ethnicity and Education Subgroup .....	52
Table 3. Demographics of Interviewed Participants .....	55
Table 4. Survey Data Analysis.....	57
Table 5. Average Rank of Statements for Surveyed Population .....	63
Table 6. Adjusted Demographics of Surveyed Participants .....	66
Table 7. Average Rank of Statements for Participants of Color.....	67
Table 8. Survey Composite Scores for Perceptions of STEM Teaching .....	69
Table 9. Average Rank of Statements based on Education Subgroup.....	70
Table 10. Results of Two-Way ANOVA.....	71
Table 11. Axial Codes based on Expectancy Value Theory .....	74
Table 12. Codes based on Critical Race Theory .....	75
Table 13. Integrated Results Matrix for Comparison of Perceptions .....	94
Table 14. Codebook within Expectancy Value Theory .....	150
Table 15. Codebook within Critical Race Theory .....	151



**List of Figures**

Figure 1. Relationship between Study Frameworks .....	27
Figure 2. Eccles' (1983) Model of Achievement, Performance, and Choice .....	35

## **Chapter 1: Introduction**

### **Statement of the Problem**

Over the last two decades, STEM occupations have increased by 79% (Funk & Parker, 2018), and while this trend is predicted to continue (Fayer et al., 2017), it is also predicted that whites will become the minority of the U.S. workforce by 2050 indicating that the involvement of people of color in the field is of utmost importance (Tossi, 2006). While the population of the United States can sustain this change in representation, those representing groups of color must be adequately prepared to take on roles in the STEM field. Currently, however, there is a considerable gap in the representation of people of color in STEM related careers; while approximately 52% of students enrolled in public schools represent groups of color such as Latinx, Native American, and African American (National Center for Education Studies [NCES], 2019), these ethnicities only represent 16% of STEM occupation holders (Funk & Parker, 2018). Implications of this also indicate that if people of color do not begin to increase their representation in the STEM field, the United States will not be able to support its future endeavors in science, technology, engineering, and math (Riegle–Crumb, et al., 2011). Therefore, research needs to be conducted in several areas to help provide guidance for increasing the representation of people of color in STEM fields.

The aim of this study is to add to current literature by investigating the career choices of high school and college students who identify as people of color with a focus on STEM education and the opportunity to become a STEM teacher. This was done by investigating perceptions of students of color in a Metro Atlanta county that have been successful in STEM through a survey based within the expectancy value framework as well as through thick description of how unique experiences of students of color within this county impact their perceptions of becoming STEM teachers. The general perceptions of students within the embedded subunits of the bounded case

who identify as white were also included in order to determine if/where perceptions are unique to students of color in order to fully understand the way oppression is structured and reproduced (Kelly et al., 1994; Mertens, 2010).

### ***Need for Diverse Teachers***

One way to help increase the representation of people of color in STEM fields is by increasing the diversity of America's STEM teachers as multiple studies have indicated that teachers of color have a strong positive influence on the education, proficiency, and motivation of students of color (Blum, 2005; Brown, 2014; Cole, 1986; Graham 1987; King, 1993b; McNeely & Falci, 2004; Resnick et al., 1997 as cited in Atkins et al., 2014).

In 1998, former Education Secretary Richard Riley stated that the U.S. teaching force should reflect the diversity of its students (Riley, 1998), and multiple studies have shown support for this statement by finding that teachers of color provide important perspectives on education, pedagogy, and curriculum that is unique to their culture (Blum, 2005; McNeely & Falci, 2004; Resnick et al., 1997 as cited in Atkins et al., 2014). A 2004 study found that same-race pairings of teachers and students increased the math and reading test scores of white and Black students by 3 to 4% (Dee), and two additional studies showed same-race pairings of teachers and students with Black and Hispanic students resulted in improved reading, vocabulary, and mathematics scores (Clewell et al., 2001; Hanushek et al., 2005). Additionally, studies have shown that teachers of color have higher expectations for students of color (Dee, 2005; Ferguson, 2003; Gershenson et al., 2005; Jussim et al., 1996; Oates, 2003) while white teachers tend to have lower expectations (Figlio, 2005). This implies that increasing the diversity of teachers could help improve the mismatch in academic achievement and expectations that is currently seen between students of color and their white counterparts (Dee 2004; Meier et al. 1999; Pitts 2005).

In addition to increasing specific subject scores and having higher expectations for students of color, teachers of color have also been shown to increase the confidence and motivation of students of color while also decreasing their sense of marginalization (Cole, 1986; Graham 1987; King, 1993b). When served by teachers who look like them, students of color are able to work with role models who understand their cultures, are better prepared to successfully navigate education and career systems and are challenged to be academically successful (Jackson & Kohli, 2016; Klopfenstein, 2005). Further, white students also benefit from being exposed to diverse teachers because increased cross-race contact lowers prejudice and stereotyping while increasing cooperation and acceptance of others (Cloutier et al., 2014; Devine et al., 2012; Paluck & Green, 2009; Pettigrew & Tropp, 2011; Plant et al., 2009). Therefore, all students in America will benefit from increasing the diversity of America's teachers.

### ***Barriers towards Recruiting Teachers of Color***

Despite the value that teachers of color bring to the classroom, America's teachers continue to be despairingly white (Sleeter, 2016). A study done by the Department of Education reported that in the 2015–2016 school year, 80% of public-school teachers were white and 76% of students enrolled in teacher preparation programs were white (NCES, 2019); when considering STEM teacher demographics specifically, it was reported in 2007 that approximately 82% of STEM teachers were white (Rushton et al., 2014). Moreover, of 1.9 million high school ACT test takers in 2015, only 4% indicated an interest in education with 70% of these students identifying as white (ACT, 2016). One explanation for this lack of racial and ethnic diversity in teachers and those who are interested in teaching is the advancement of the common dominant interest that a one-size fits all education is best (Gist, 2017; Ladson-Billings, 1998).

In their article about diversifying the teaching force, Sleeter and Thao (2007) state, “We view this demographic gap not as a permanent natural condition, but rather as a social creation that has historical roots and that can be changed” (p. 3). These historical roots go back to 1954 when schools were desegregated. With the ruling of *Brown v Board of Education*, many schools for people of color closed resulting in almost 40,000 teachers of color losing their jobs (Ahmad & Boser, 2014; Bell, 1980; DeCuir & Dixson, 2004). Since then, teachers of color have continued to be pushed away from careers in education due to societal, financial, educational, and licensure barriers.

As indicated by a lack of interest and media portrayal, society lacks respect for teaching as a profession (Burrant et al., 2002). To make matters worse for recruiting teachers of color, many students of color have negative interactions at school (Burrant et al., 2002), and the media reinforces negative narratives about teaching as well as the relevancy and competency of teachers of color (Jackson & Kohli, 2016). For example, the Atlanta Public Schools cheating scandal of 2009 resulted in teachers accused of cheating on standardized tests being charged with racketeering which is generally associated with mobs and gangs (Jackson & Kohli, 2016); according to Cooper (2015), this “racial profiling and scapegoating of black teachers [is] reflective of an unjust schooling system that perpetually fails both students and teachers of color” (p. 1).

However, members of communities of color often exhibit motivation to impart knowledge, be a role model, and to improve educational conditions for people of color as key internal motivators (Brown, 2002; King, 1993a), so despite negative societal images, people of color may still pursue teaching because it is one way in which these motivators can be actualized (Burrant et al., 2002). Still, the pursuit of teaching credentials often leads to additional challenges that further turn people away from teaching. One such challenge is the financial barrier that is posed when

obtaining a teaching degree and license. Currently, despite the fact that teaching offers fewer monetary rewards, the preparation period is as long as it is for other professions or for one to obtain a master's degree in a specific field of interest (Ahmad & Boser, 2014; Mitchell et al., 2000; Torres et al., 2004, p. 41; Vegas et al., 2001), and the lack of financial aid opportunities leads many students interested in teaching to believe that "the significant financial barriers to teaching frequently outweigh the benefits" (Ahmad & Boser, 2014, p. 14).

Another challenge towards recruiting and retaining effective teachers of color is the lack of teacher education programs and recruitment efforts that are targeted towards supporting the unique needs of preservice teachers of color. A significant relationship has been found between enrollment of students of color in teacher preparation programs and the number of support services and ethnic opportunities offered (Case et al., 1988), so career counseling, employment guidance, and learning group opportunities could be effective measures for universities looking to recruit students of color into teacher preparation programs (Fenwick, 2000; Gederman, 2001; Torres et al., 2004). However, teacher preparation programs are currently not designed to engage with the experiential knowledge that teachers of color possess (Brown, 2014; Gist et al., 2019; Jackson & Kohli, 2016; Sleeter, 2016; Sleeter & Thao, 2007; Tellez, 1999), and often times, the most impactful experiential knowledge that people of color bring to education is "socialized out" because while people of color see racism as something that should be acknowledged, teacher education programs and schools in general are "silent about racism" (Barrant et al., 2002, p. 13). This leaves preservice teachers of color feeling unwanted, undervalued, and/or unqualified to effectively teach.

Further, preservice teachers of color who do successfully navigate and overcome the oppositional tensions between personal and systemic ties (Gist, 2017, p. 931) must then face

additional barriers in the form of licensure exams. Smith (1989) claims that, “standardized tests discourage [teacher candidates of color] and have kept 38,000 potential teachers of color out of the profession” (p. 10); essentially, the testing required for teacher certification is another manifestation of the neutrality and color-blind policies of education that should be challenged (Solorzano & Delgado Bernal, 2001; Sleeter, 2016). Trainee teachers of color score lower on licensure exams than their white counterparts (Ahmad & Bosers, 2014), and specific examination of both Physics and Chemistry Praxis subject tests between 2006 and 2016 found that not only do people of color have lower pass rates, but there are also additional factors in test questions that reveal bias towards test takers of color (Shah et al., 2018a; Shah et al., 2018b). Essentially, national statistics continue to support the idea that “both content standards and assessments are clever tools for solidification and consolidation of [white ideals]” (Barrant et al., 2002). Therefore, in an attempt to challenge this institutionalized racism, this study investigated how the unique experiences of students of color have impacted their perceptions towards teaching as a career.

### **Justification of Study**

This study is specifically interested in understanding the perceptions that students who identify as people of color have towards becoming STEM teachers. In my own experience, teaching as a profession is looked down upon as a career choice while people ironically thank me for the work I do every day. Ultimately, this skewed view also impacts students as they consider careers (Brown, 2014; Quirocho & Rios, 2000; Su, 1997). Even though many students enjoy tutoring, working with others, and have a passion for STEM classes, they are adamantly against choosing teaching as a profession. Research shows that while many students and cultures hold teachers in high regard, this is in contrast with the low status position in the US context (Brown, 2014; Gordon, 2000); in American society, “teaching is akin to paid labor... and is far below the

status of venture capitalists, dot.com company founders, and entrepreneurs (Barrant et al., 2002, p. 12).

Ironically, however, we have heard the cry for more highly qualified STEM teachers for years (Augustine, 2005; STEM Educator Pipeline, 2013; US Department of Education, 2016), and research consistently shows that increasing the amount of highly qualified STEM teachers of color will better prepare future generations of students of color to fill important jobs in the U.S. STEM workforce. So, this study utilized a transformative view that there are various versions of reality based on social positioning with the overall goal of increasing recruitment of STEM teachers of color in an effort to help proposition a long-term solution to the needs of the country. Literature explains what factors influence career choice (Dunteman et al., 1978), a need for diversity in STEM fields and classrooms (Allen–Ramdial & Campbell, 2014), and why people choose teaching (Richardson & Watt, 2006). However, there is general sparsity in the literature in terms of the driving factors in multicultural vocational choices (Graham & Erwin 2011; Lent, 2005), and though some research has addressed the imbalance of people of color in some careers, few studies have addressed the issue in teaching (Graham & Erwin 2011; Smith et al., 2004). Therefore, this study utilized a case study research tradition designed within the Expectancy Value and Critical Race Theory frameworks to investigate factors that influence students who identify as people of color’s perceptions of becoming STEM teachers.

### **Purpose and Research Questions**

Research shows that teachers who “cultivate safe, respectful, culturally sensitive, and responsive learning communities” are valued by students (Sleeter, 2016, p. 9) and that student achievement levels increase when their teachers share similar racial, cultural, and/or linguistic backgrounds (Achinstein et al., 2010; Dilworth & Brown, 2008; Duncan, 2010; Villegas & Davis,



2008). These studies and others indicate that teachers of color need to be recruited (Achinstein et al., 2010; Guyton et al., 1996; King, 1993a; Quirocho & Rios, 2000; Sleeter & Milner, 2011), but preservice teachers have and continue to be exceedingly white (Sleeter, 2016). A study done by the Department of Education reported that in the 2015–2016 school year, 80% of public-school teachers were white and 76% of students enrolled in teacher preparation programs were white (NCES, 2019). When considering STEM teachers specifically, there is considerably less diversity than the general population of teachers. For example, STEM teacher demographics in 2007 was reported to be approximately 82% white, 8% Black, and 10% other (Rushton et al., 2014) which is despairingly different from the student population which is currently only 49% white with an expected decrease to 45% by 2027 (“The Condition of Education,” 2019).

As a teacher, I have witnessed students who have a love for working with and teaching students, but they rarely consider choosing teaching as a profession. Therefore, due to personal experiences and the need for increased diversity within STEM classrooms, the purpose of this study was to reach a deep understanding of the factors that affect high school and college students choices in whether to enter the education career field as a teacher in a K–12 traditional STEM classroom setting among students who identify as people of color. Further, this study will also contribute to the body of literature that exists on understanding how people of color choose various career paths. Using Expectancy Value Theory and Critical Race Theory as theoretical frameworks, the following research question was generated:

- How do the experiences of successful STEM students who identify as people of color influence their perceptions of a career as a STEM teacher?

Specifically, this study looked at a bounded case in one county in the Metro Atlanta area in order to address the following secondary research questions:

- Is there a statistical difference between perceptions of teaching and perceptions of an ideal career for students who identify as people of color?
- Is there a statistical difference of perceptions of teaching between students who identify as people of color when compared to the perceptions of students who identify as white when considering current level of schooling?
- How have the unique experiences of students in this county who have shown strength in science and math and who identify as people of color influenced their perceptions of teaching?

The primary and secondary research questions are justified as Lent, Hackett, & Brown (1999) call for researchers to study the school–work transition experiences of diverse groups, and Lent (2005) highlights the sparsity in the literature in terms of the driving factors in multicultural vocational choices. Additionally, though literature exists for how culture and ethnicity influence career choices, little research has been done that includes participants that are not in college (Lent, 2005). Last, while some research has addressed the imbalance of people of color in some careers, few studies have addressed the issue in teaching (Graham & Erwin, 2011; Smith et al., 2004), and it is unclear whether there is a diversity of perspectives about teaching within and/or across different racial groups (Brown, 2014, p. 333).

Ultimately, this study will contribute to the body of literature that exists on understanding how people of color choose various career paths. Expectancy Value Theory explains that choice differences between individuals can be linked to personal experiences (Wang & Degol, 2013) and that career paths are valued when occupation characteristics align with individual subjective task values (Eccles, 2011); career development is considered to be an integral part of identity formation (Munley, 1977), and Critical Race Theory provides a framework to investigate how decisions are

made within unique identities of people of color (Bowleg, 2012; Cole, 2009). Therefore, these frameworks were used to inform the methodology and analysis for in depth study of how students who identify as people of color choose various career paths and their perceptions of choosing teaching as a career.

### **Conceptual Framework**

As a researcher, I bring a transformative worldview in order to understand the perceptions of students of color towards becoming a STEM teacher. Transformative approaches to qualitative research seek to reject cultural relativism by recognizing that various versions of reality are based on social positioning (Creswell, 2007). Within this framework, the researcher believes that “knowledge is not neutral” because it reflects social relationships within society (Creswell & Poth, 2018, p. 25). By employing both Expectancy Value and Critical Race Theory frameworks, the study worked to ensure the voices of participants were heard as individuals. Further, results of this study could help change the underrepresentation of people of color in STEM classrooms and STEM careers by reforming teacher recruitment methods. Utilizing the transformative view that there are various versions of reality based on social positioning, the overall goal of the study is to inform current literature on how changes can be planned to increase the representation of people of color in STEM classrooms and STEM careers.

### **Local Context**

During my first-year teaching as part of Teach for America, I was at a small school in rural South Carolina where I was one of 4 white teachers in the school with less than 2% of the student population being white. While at district meetings, I noticed that many leaders talked down about my students in a way that claimed that since they were students of color from low-income communities, they weren’t expected to amount to much of anything. Hearing these things upset

me because they did not align with what I saw in my classrooms; I had students who were becoming first generation college students, getting scholarships for college, and who were learning to enjoy science and to see their own potential. Ultimately, my experience in both the classroom and graduate courses has led me to believe that one way to increase the representation of people of color in STEM careers is to increase the representation of teachers of color in STEM K–12 classrooms.

My “agenda” for taking up this topic in this setting at this time is the current push for the United States education system to provide highly qualified workers for STEM careers. As the current generation of STEM workers begins to retire, it is of utmost importance that people of color be able to help fill these positions as well as the new ones being created (Riegle–Crumb & King, 2010). This agenda has been influenced by the literature stating that one way to go about doing this is to increase the number of STEM teachers of color (Brown, 2014; Cole, 1986; Graham 1987; King, 1993a). Additionally, there is a current “greening” of the teacher work force (Ingersoll & Merrill, 2013), so now is a good time to strategically focus efforts on recruiting qualified STEM teachers of color into the field. Therefore, my agenda is one based on increasing recruitment of STEM teachers of color to help proposition information that may be used to inform a long–term solution to a specific need of the country.

### *Statement of Subjectivity*

As a middle–class, white female studying the perceptions of successful STEM students who identify as people of color, I may not be able to fully understand the perceptions and factors that influence their decisions on whether to become educators. However, I have only taught in diverse classrooms, so I have a unique eye for understanding how adolescent students who identify as people of color process experiences within a STEM classroom setting. My personal experiences

working with high school students who identify as people of color in a STEM classroom has allowed me to constantly see students like the participants rise to challenges and to show true strength in teaching materials to their peers. Therefore, I feel very strongly about helping to discover factors that influence these students' decisions to become K–12 STEM teachers because I would like to inform current literature that may lead to the implementation of changes that could increase the diversity of America's K–12 STEM teachers. These strong views may have led to misinterpretation of interview data, so time was taken to conduct member checking of the coded interview responses by having participants read the study's findings in order to ensure validity and trustworthiness of participant portrayal.

Additionally, some of the participants who were interviewed knew that I am a high school STEM teacher; this may have influenced their choice of words for the questions asked during the interviews which in turn could have affected the data collected. Therefore, it was important to account for this when determining codes and overall implications of the study. Further, the students' familiarity with the researcher may have influenced how much information they chose to divulge; so, time was taken to ensure the participants were comfortable in order to encourage them to openly discuss their ideas of teaching.

### **Organization of Study**

The remainder of this dissertation is comprised of four chapters. Chapter 2 provides a comprehensive review of literature on how Expectancy Value Theory and Critical Race Theory can be used to understand identity formation and career choices. In Chapter 3, the research methodology and specific details on how the study was conducted is discussed. Chapter 4 presents a detailed description of the research findings followed by an interpretation of findings in Chapter 5.

## **Chapter 2: Literature Review**

This chapter reviews relevant literature pertaining to this study. The chapter is broken into two parts: (1) an introduction that highlights topical research related to the need for highly qualified STEM teachers of color, and (2) an overview of identity formation, Expectancy Value Theory, and Critical Race Theory as they pertain to career choice. This order of review reflects the explanation of the problem at hand and the application of specific theoretical frameworks as they pertain to considering the need for increased representation of people of color as teachers in STEM classrooms.

### **Introduction**

On a large scale, the United States needs highly qualified STEM teachers. As the world continues to evolve and develop innovative techniques, science, technology, engineering, and math (STEM) careers are increasing at a rapid rate. Recently, the number of STEM jobs has grown at a rate of three times faster than non-STEM related jobs, and this exponential growth is expected to continue for several decades (Langdon et al., 2011). With the expected increase in STEM-related careers, there is a directly related need for students with advanced STEM knowledge and skills which in turn causes a need for highly qualified STEM teachers.

However, according to the National Science Foundation, while one third of students entering college intend to major in a STEM related field, approximately half of these students will switch their majors by their second year of college (Chen, 2009); this shortage of students prepared to successfully pursue STEM majors and careers is a direct result of the lack of highly qualified STEM teachers in secondary classrooms (Augustine, 2005; US Department of Education, 2016). Literature indicates that the physical sciences are taught by more out-of-field teachers than other subjects (Ingersoll, 2003), and a longitudinal study of the schools and staffing survey (SASS)

indicated that 83% of public high school students are taught science by teachers who did not major in science (Rushton et al., 2014). In recent decades, programs such as PCAST, UTeach, Woodrow Wilson Teaching Fellowship, Teach for America, Physics Teacher Education Coalition, and the National Science Foundation's Robert Noyce Teacher Scholarship Program have been put in place as incentives for increasing the number of STEM teachers over the next decade (STEM Educator Pipeline, 2013). However, the 2015 National Future Educators Report indicated an average of a 1% decrease in the number of ACT-tested graduates who expressed interest in teaching every year between 2011 and 2015 resulting in less than 5% of test takers expressing an interest in teaching as a career (ACT, 2016).

### ***Representation of People of Color in STEM Fields and Classrooms***

When considering the demographics of those who choose to major in a STEM field in college, research has shown that while people of color are just as likely as their white counterparts to declare a STEM major (Riegle-Crumb et al., 2019), the percentage of students of color who actually graduate with a degree in STEM is low compared to their white counterparts. According to the National Center for Education Statistics (2019), of the almost 668,000 STEM degrees awarded in 2016, 64% were awarded to white students even though white students only made up 20% of students pursuing STEM majors four years earlier at the time of enrollment (Riegle-Crumb et al., 2019). Considering how the lack of qualified STEM teachers impacts the number of qualified STEM graduates, this misrepresentation in people of color who are interested in STEM fields and those who are successful and persistent in STEM majors may be partially due to the skewed demographics of high school STEM teachers.

Recent reports have found that 82% of current STEM teachers are white (Sleeter, 2016) which is despairingly different from the student population which is only 49% white with an

expected decrease to 45% by 2027 (“The Condition of Education,” 2019). This mismatch in the representation of people of color is of particular concern because diverse teachers have not only shown to increase academic achievement and expectations for both students of color and white students (Achinstein et al., 2010; Brown, 2014; Dee 2004; Meier et al. 1999; Pitts 2005; Quijano & Rios, 2000; Sleeter & Milner, 2011), but when served by teachers who look like them, students of color are better prepared to successfully navigate education and career systems (Brown, 2014; Klopfenstein, 2005). Therefore, in order to meet the demand for increased representation of people of color in STEM fields, we must also increase the representation of teachers of color in K–12 STEM classrooms.

### ***Topical Research on Perceptions of Teaching***

Other studies that have attempted to better understand why students do or do not consider teaching as a career have investigated the phenomena in relation to specific identifying characteristics because “without research that focuses on the various ethnic and racial subgroups, the extant literature does not provide a comprehensive picture of the perspectives and experiences of various demographic subgroups” (Graham & Erwin, 2011, p. 400). Generally, literature supports that assumptions cannot be made about career choices related to teaching without considering sociohistorical, sociopolitical, and sociocultural issues (Graham & Erwin, 2011; Pate et al., 1989; Summerhill et al., 1998), and many studies specifically citing working conditions, respect, and personal value as main sources of disinterest in the career (Andin et al., 2017; Christensen et al., 2019; Florida State Department of Education [FSDOE], 1985; Frei et al., 2017; Graham & Erwin, 2011; Page & Page, 1984; Pate et al., 1989; Summerhill et al., 1998)

One study that is particularly similar to this one examined perceptions of high-achieving high school aged African American males towards teaching as a viable career option (Graham &



Erwin, 2011). In this study, surveys and focus groups were used to identify themes that dissuaded participants from considering teaching. The authors found that participants repeatedly mentioned negative perceptions of teachers and teaching, described schools as oppressive institutions, and commented that they were “nonconformists” (Graham & Erwin, 2011). Essentially, the participants explained that their daily experiences as people of color in schools tremendously shaped their experiences with teachers, staff, and administrators and ultimately led them to believe that they had no place in the teaching profession (Graham & Erwin, 2011, p. 407). Similarly, other studies that investigated dissuasion from teaching based on race / ethnicity found that lack of respect for teachers, lack of recognition, low salary, discrimination, working conditions, discipline problems, and a general “lack of interest in learning by students” were often mentioned as reasons for people of color not to consider teaching as a viable career (FSDOE, 1985; Page & Page, 1984; Summerhill et al., 1998).

However, in addition to understanding why people of color may not consider teaching as a profession, some of these studies have also investigated areas that could be changed so that these participants might be more likely to consider the profession. One study that investigated high school seniors’ perceptions of teaching found that if teachers had better working conditions such as smaller class sizes, fewer discipline problems, or increased salary that students may reconsider becoming a teacher (Summerhill et al., 1998). Another study found that for people of color, someone simply talking to them about teaching could make a difference as the majority of respondents in the study (74.3%) stated that no one had ever led them to consider the profession (Page & Page, 1984). Further, Christensen et al. (2019) found that high school students would be more likely to consider teaching if they had confidence in their ability to be a good teacher, if they were encouraged by others to become a teacher, or if they felt like their community supported

teachers. Essentially, though working conditions may be difficult to change, these studies indicate that persuading students of color to consider teaching could be as simple as a conversation from a respected individual such as a parent, counselor, or teacher. This study further investigated these aspects by asking interviewed participants what could make them change their minds about considering teaching as a profession.

Moreover, like one of the goals of this study, other researchers have also attempted to understand how career paths chosen by students compare to that of teaching in order to better understand how teacher recruitment programs could be modified. One particular study by Pate et al. (1989) sought to understand how perceptions of students' ideal careers compared to those of teaching when considering specific career values. In this study, high school juniors and seniors completed a survey that asked them to rank their ideal career(s) as well as their career values. The study found that students who were considered "academically talented" valued independence, economic gain, and intellectual challenges most in their careers, and while teaching can satisfy intellectual challenge, the study found that participants felt teaching does not provide independence or economic gain (Pate et al., 1989); the researchers also found that students believed teaching could fulfill career values of providing job security and moral fulfilment, but these were not among the most highly valued aspects for high-achieving students. Other studies found that an interest in working with children, the importance of having free time, and prioritization of a social work environment may also be career values that can be fulfilled by teaching that many people do not consider (Frei et al., 2017; Swanson, 2011), so this study aims to add to the extant literature by providing a level of comparison between perceptions of teaching and that of an ideal career on latent factors of expertise, demand, morale, salary, and social status.

### **Theoretical Frameworks**

To enhance literature on current teacher recruitment efforts for people of color in K–12 STEM classrooms, this study focuses on understanding how experiences of successful STEM students who identify as people of color impact their perceptions of a career as a STEM teacher. The research took a sub–problem approach in which a bounded case study was used to identify perceptions of teaching compared to an ideal career from students who have been successful in science and math. First, the study utilized the Factors Influencing Teaching Choice (FIT–Choice) Survey to identify general perceptions of students of color towards teaching compared to an ideal career; then, interviews were conducted within the bounded population in order to better understand how the experiences of successful STEM students of color at one public high school and one public university in the county have influenced their perceptions of teaching.

In order to accomplish these goals, the study used Expectancy Value Theory and Critical Race Theory as foundations for theory, data collection, and analysis. When considering how people make choices, it is important to understand how identity is formed because various facets of identity are interconnected with gender, race, and ethnicity (Andersen & Ward, 2014; Carlone et al., 2014; Correll, 2001; Martin, 2000). Literature indicates that Expectancy Value models are suitable for comparing achievement and occupation related choices and perceptions within and between cultures (Wigfield et al., 2004), and Critical Race Theory provides a helpful lens for analyzing the whiteness of teacher education and conceptualizing how it might be addressed (Bell, 1987; Sleeter, 2016). Therefore, a theoretical framework comprised of these components was used to study how culture influences career perceptions and aspirations.

Occupational choice development is an integral part of identity formation (Erikson, 1968; Munley, 1977), and Expectancy Value Theory provides a lens by which to understand how

personal experiences impact choice by postulating that career paths are valued when occupation characteristics align with individual subjective task values (Eccles, 2011; Wang & Degol, 2013). Further, due to this study's focus on the underrepresentation of teachers of color in STEM classrooms, the Critical Race Theory framework was used to investigate how decisions are made within unique identities of people of color (Bowleg, 2012; Cole, 2009).

**Figure 1**

*Relationship between Study Frameworks*

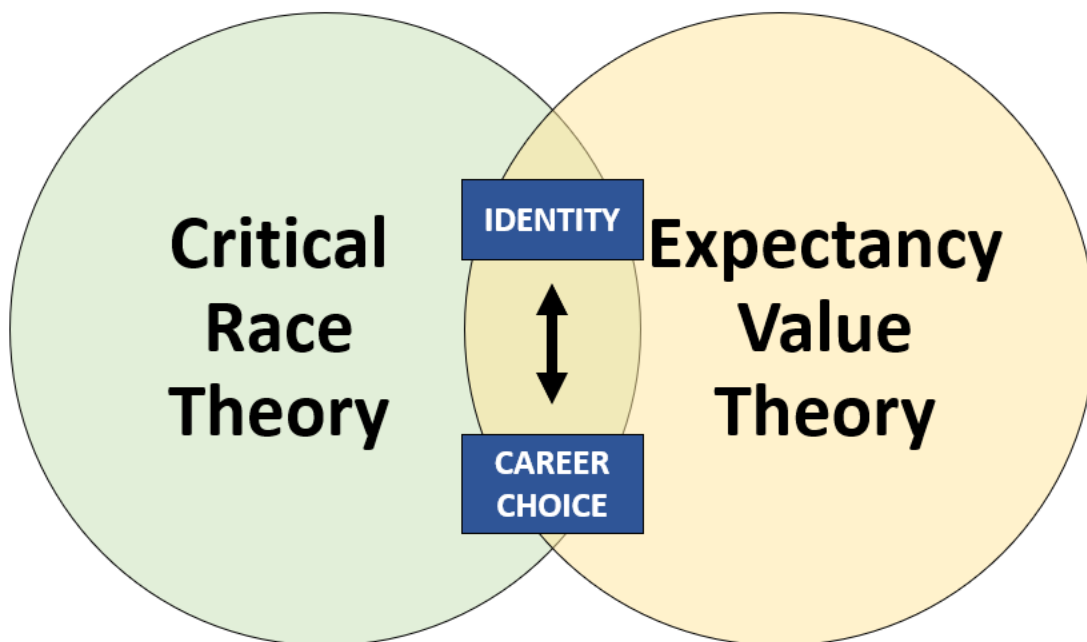


Figure 1 illustrates the application of these frameworks in this study. This case study focuses on adolescents who are in the process of choosing a career which largely influences identity development (Erikson, 1968; Munley, 1977), and the frameworks were used to inform the methodology and analysis for an in-depth study of how students who identify as people of color choose various career paths and their perceptions of choosing teaching as a career. Because both Expectancy Value Theory and Critical Race Theory are frameworks for understanding identity

development and career choices, they were further used to analyze how the individual experiences of the participants of color in this study have helped form their identities and influenced their career choices (Brown, 2014; Eccles, 2009; Phinney, 1989; Robinson et al., 2018; Sleeter, 2016; Solórzano & Yosso, 2002; Wigfield et al., 2004).

### ***Identity Formation***

Identity can be defined as a sense of who one is as a person and as a contributor to society (Hoare, 2002). In the 1950s, Erik Erikson proposed a life-span model of human development that explained how conflict and crisis mold identity and development during different stages of life (Erikson, 1959; Erikson, 1968; Sokol, 2009). Within this model, adolescence is defined as the transitional period between childhood and adulthood during which a main task is to develop a coherent sense of identity (Erikson, 1968). Identity development consists of exploration, consideration, and decision making (Marrتين et al., 2018), and puberty, increased independence, and increased interactions with communities through school, sports, jobs, etc. provide adolescents with opportunities to explore and navigate ideologies, relationships, and vocations (Erikson, 1968; Sokol, 2009). When considering the relationship between identity and career choices, Erikson proposes that determining an occupational identity is a central challenge of identity development in late adolescence (1968).

The development of occupational identity involves two specific developmental tasks for understanding occupational choices (Erikson, 1959; Erikson, 1968; Marcia, 1966; Sokol, 2009). First, people must explore their selves and their environments which involves active consideration of interpersonal issues, ideological issues, and alternative life paths (Erikson, 1959; Erikson, 1968; Marcia, 1966; Sokol, 2009). Then, people attain commitment to a career path which allows for a clear sense of self-definition across all domains of exploration (Erikson, 1959; Erikson, 1968;

Marcia, 1966; Sokol, 2009). Essentially, as people develop structured organization of drives, abilities, beliefs, and individual history, they can see their similarities and unique qualities as well as define their strengths and weaknesses (Marcia, 1980); however, the development of these structured organizations involves exploration, crisis, and commitment in unique combinations based on individual experiences, so differences in vocational choices may be better understood if researchers consider exploration as a central part of identity formation (Grotevant, 1987; Kroger et al., 2010; Meeus, 2011).

**Identity Formation and Expectancy Value Theory.** Research has shown that sociocultural experiences regarding learning environments and opportunities shape identities and values and thus influence the Expectancy Value model of choice (Eccles, 2009; Wigfield et al., 2004). Within Expectancy Value (EV) Theory, choice is the product of rational cognitive processes and affective memories, cultural stereotypes, and socialization (Gottlieb, 2015), and therefore, identities are dynamic entities that are continually formed and reformed. In working to understand achievement-related choices, Expectancy Value theorists have concluded that collective identities that involve perceptions of skills, characteristics, competencies, values, and goals are proximally linked to individuals' expectancies and beliefs (Eccles, 2009). These expectancies and beliefs exist within an "intra-individual hierarchy" (Gottlieb, 2015), and EV Theory views choices as being made within a "complex social reality that presents each individual with a wide variety of choices" (Eccles & Harold, 1992, p. 9).

Identity development involves both general and domain specific exploration, consideration, and decision making (Marrتين et al., 2018); general identity refers to decisions regarding one's overall life plan, and domain specific identity formation addresses decisions that are specifically related to one domain (i.e. a career). Lave and Wenger (1991) propose an idea of

“identities-in-practice” that views identities as being formed through engagement with community, and Tan and Calabrese Barton (2008) describe adolescents as having more than one identity-in-practice depending on the community in which they are engaged. More specifically, academic and occupational choices are potential enactments of identity components meaning these choices reflect general expectancy value and competency beliefs within that domain (Robinson et al., 2018), and individuals are more likely to “engage in activities that affirm important aspects of their identity” (Gottlieb, 2015, p. 1370). Attainment value acts as the link between a given task and an individual’s identity, so as identities develop and change, attainment value will also change (Gottlieb, 2015). Overall, identity development processes have important implications for career outcomes (Eccles, 2009; Estrada et al., 2011; Hernandez et al., 2013; Robinson et al., 2018; Woodcock et al., 2012), and students’ competence beliefs are important in identity development (Chemers et al., 2011; Eccles, 2009; Robinson et al., 2018; Robnett et al., 2015). In line with considering how EV theory considers choice as a function of identity, this study specifically asked and sought to understand how participants’ experiences have influenced their perceptions of teaching.

**Ethnic Identity Formation.** Research has also shown that specific domains of identities are influenced by different interactions. For example, multiple studies have observed that gender and racial differences of science identity and career choice may be the result of discrimination, inequality, and/or additional barriers (Koenig, 2009; Myers & Pavel, 2011; National Science Board, 2016; Wong et al., 2003) while others describe students’ identities as trajectories that move further from or closer to desirable affiliations (Jackson & Seiler, 2013). This implies that individuals must continuously negotiate their personal narratives of self in order to convince

themselves and others of what career paths are best representative of their identities (Homegaard & Ulriksen, 2014).

In the process of developing a strong identity of self, people must navigate personal variables such as individual traits, interests and abilities as well as environmental variables such as contextual factors, social status, ethnicity and gender (Hartung, 2002). Further, research has shown that regardless of the specific ethnic group, “[youth of color] face a similar need to deal with the fact of their membership in an ethnic minority group in a predominantly white society” (Phinney, 1989, p. 45). Essentially, cultural interests may “contribute either to the creation of identity crises and/or to their resolution” (Waterman, 1982, p. 354), and experiences in school provide opportunities for views to be challenged and for promising identity alternatives to be presented (Waterman, 1982). Adolescents in the United States are constantly exposed to and provided opportunities to engage with people from different ethnic groups which provides opportunities for adolescents to examine, learn about, and develop an understanding of the meaning and implication of their own and others’ ethnicities (Phinney, 2000, p. 28). Further, culture influences how much vocational choice people have available, so cultural socialization, learning environment experiences, and individual cultural values lead to “both cultural group differences and within–culture individual differences in expectancies, ability self–concepts, and subjective task values” (Wigfield et al., 2004, pp. 172–173). Therefore, it is important to understand and investigate group and ethnic identities for people of color in multicultural societies (Phinney, 2000) because while race and ethnicity do not directly influence career aspirations, they do influence perceptions of career related opportunities and thus the development of occupational identity (Fouad & Byars–Winston, 2005). This justifies the choice of this Metro Atlanta county as



the bounded case for this study because the unique demographics, interactions, and experiences provided within the population lead to unique experiences for people of color.

Other studies specifically investigating identity–career relationships of people of color have aimed to determine how career decision making is related to the “broader cultural milieu in which individuals grow up” (Wigfield et al., 2004, p. 166). For example, a study investigating Latinas’/os’ perceptions of career barriers and how they relate to self–efficacy revealed that career decision self–efficacy mediates the influence of ethnic identity and acculturation level on the perception of career barriers; this led the authors to conclude that ethnic identity augments students of color’s career decision self–efficacy and increases awareness of career barriers (Mejia–Smith & Gushue, 2017). Another study examining how career decision–making self–efficacy is related to vocational identity and the degree of engagement in career–related activities in African American adolescents determined that “students who had greater self–confidence in making career–related decisions were also likely to have a better–defined sense of their interests, abilities, and goals as well as to actively engage in activities related to career exploration” (Gushue et al., 2006, p. 24). Essentially, these findings indicate that various facets of identity are interconnected with gender, race, and ethnicity when considering the career choices of people of color (Andersen & Ward, 2014; Carlone et al., 2014; Correll, 2001; Martin, 2000). Therefore, the unique experiences of people of color within this bounded case can be used to better understand how they have impacted occupational identity and perceptions towards becoming a STEM teacher.

### ***Expectancy Value Theory and Career Development***

Expectancy Value (EV) Theory views achievement related choices–both occupational and educational–as being directly related to expectations for success and value associated with available options (Eccles et al., 1983). During early development of Expectancy Value Theory,

Atkinson proposed that motivation towards a task was influenced by whether an individual expected to fail or succeed as well as the attractiveness of this expectation for success or failure (1957). As the theory developed, the main constructs of expectancies, values, and beliefs have been better defined and validated with Eccles et al.'s theory being considered the most relevant for understanding achievement-related choices (Eccles et al., 1983; Eccles, 1992; Lykkegaard & Ulriksen, 2016; Wigfield, 1994; Wigfield et al., 2004). Essentially, Expectancy Value theorists believe that individuals perceive tasks and achievement related choices in terms of characteristics that are related to their own personal needs and values (Eccles et al., 1983; Eccles, 2011). Though originally aimed at understanding gender differences regarding mathematics, Eccles et al.'s EV Theory is now widely accepted as a foundation for understanding achievement-related choices of individuals in various domains (Eccles, 2009; Eccles, 2011; Wang & Degol, 2013; Watt et al., 2012; Watt et al., 2017; Wigfield et al., 2004).

Eccles defines “expectancies for success” as one’s beliefs about how well they will perform a task and “ability beliefs” as how individuals evaluate self-competence and ability towards a task based on their past successes (Eccles et al., 1983; Wigfield, 1994; Wigfield et al., 2004). According to the theory, both expectancies and ability beliefs are directly influenced by subjective task values which are related to attainment, interest, usefulness and cost (Wigfield & Eccles, 2000). Attainment value describes how important doing well on a task is to an individual; intrinsic value describes the enjoyment an individual gains from doing a task; utility value describes the usefulness of a task or how well completion of a task fits into future plans; and cost describes the effort needed to engage in and complete a task (Wigfield & Eccles, 2000). EV Theory proposes a linear model of influence (

When considering how EV Theory predicts occupational choice outcomes, studies have shown that due to the domain specific nature of expectancies and beliefs, specific career paths are more valued when the characteristics of the occupation most closely match the individuals' subjective task values (Eccles, 2011; Wigfield & Eccles, 2000). The application of EV Theory in this study helps provide context for why participants perceive a career as a STEM teacher in the way that they do; the FIT–Choice survey in addition to interview questions that are aligned with EV Theory helps describe how the individual experiences of students who identify as people of color have influenced their perceptions of becoming a teacher.

## Figure 2

*Eccles' (1983) Model of Achievement, Performance, and Choice*

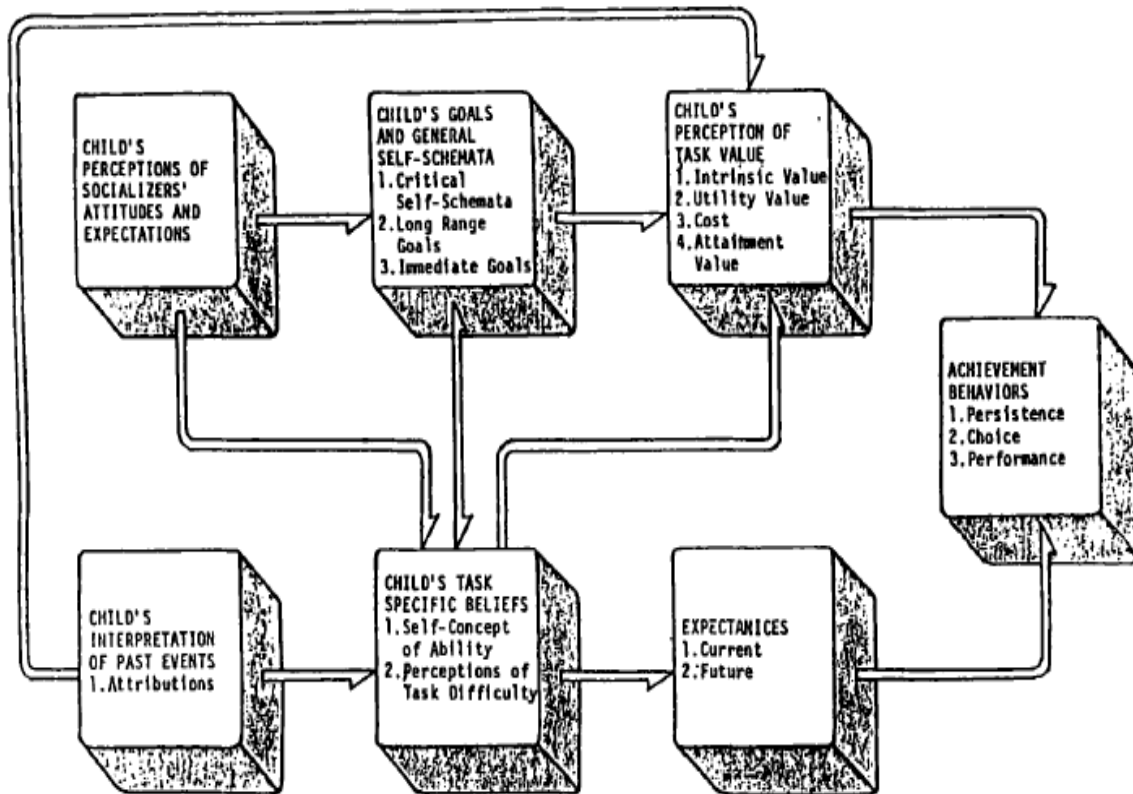
*Note.* This figure shows the linear and reciprocal model of influence in which competence beliefs and goals influence expectancies for success and subjective values, and the causal sequence that continues to evolve as new experiences and influences are encountered. From “Expectancy–Value Theory of Achievement Motivation: A Developmental Perspective” by A. Wigfield, 1994. *Educational Psychology Review*, 6(1), 49–78. <http://doi.org/10.1007/BF02209024>.

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**Error! Reference source not found.**) in which competence beliefs and goals influence expectancies for success and subjective values, but reciprocal influence of each of these constructs

leads to a complex causal sequence that continues to evolve as new experiences and influences are encountered (Eccles et al., 1983; Wigfield, 1994). Subjective task values are continuously shaped by psychological, biological, and socialization factors including competence beliefs, goals, interests, genetics, hormones, cultural influence, social expectations, and personal experiences (Eccles, 2005; Eccles, 2009; Eccles, 2011; Wang & Degol, 2013; Wigfield & Eccles, 2000; Wigfield et al., 2004), so the personal value of available options and choices is relative due to individuals' assessment of abilities and potential (Eccles, 2005). Ultimately, Eccles claims, "it is the hierarchy of subjective task values and expectations for success that matters rather than the absolute values of both of these beliefs systems" (2005, p. 11).

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**Factors influencing Career Choice.** Expectancy Value Theory suggests that occupational choice differences between individuals can be linked to personal experiences, peer interactions and family contexts (Eccles, 2011; Wang & Degol, 2013), and each of these can be classified as either external or internal influencers. External factors such as gender, race, ethnicity, location,

socioeconomic status (SES), and age have been found to have indirect effects on the career choices of people of color with the most impactful of these factors being gender, race/ethnicity, and SES (Bounds, 2017; Lent & Brown, 1996; Schmitt–Wilson, 2012). Lent and Brown (1996) found that ethnicity and gender influence the context of self–efficacy and outcome expectations; a study by Schmitt–Wilson (2012) found that SES directly affects educational experiences; and Bounds (2017) identified career decision competency and ability beliefs as being significantly and positively correlated with ethnic identity.

Other environmental factors such as interactions, encouragement, and discouragement from role models including teachers, counselors, current professionals, peers, and people seen in the media are also documented as sources of influence on career choice and development (Bobo, 1998; Dick & Rallis, 1991; Farmer, 1987; Fielstra, 1955; Fisher & Griggs, 1994; Griggs, 1992; Jones & Larke, 2003; Manuel & Hughes, 2006), but parental interaction is considered to be the most influential external factor in career development (Alden & Seiferth, 1979; Basow & Howe, 1979; Birk & Blimeline, 1984; Leifer & Lesser, 1976; Steinke & Kaczkowski, 1961). Both males and females consistently indicate that their mother and father are the most influential role models in helping guide career choices (Dick & Rallis, 1991; Paa & McWhirter, 2000), and studies have found that people of color’s career choices are more heavily influenced by parents than the choices of their white counterparts (Constantine, 2007; Fisher & Griggs, 1994; Fisher & Padmawidjaja, 1999; Griggs, 1992; Jacobs, 2005; Mau & Bikos, 2000).

Studies have also identified external factors related to career awareness such as salary or lifestyle as factors affecting career choice. When specifically considering becoming an educator, Delong (1987) identified external factors of location and lifestyle flexibility as positively influencing decisions to become teachers while numerous studies have indicated that low salary,

dissuasion from parents and peers, low social prestige, and lack of career advancement opportunities as external factors that negatively influence the choice to become a teacher (Curtis, 2012; Shipp, 1999; Watt & Richardson, 2007). This study further investigated these external influencers through interview questions that asked participants to reflect on what people, experiences, and opportunities have impacted their success in STEM subjects as well as their current choices of intended college major and/or career path. Additional questions asked students to specifically outline their positive and negative perceptions of teaching and of their ideal careers in order to further investigate external influencers and their impact on their perceptions of teaching.

Internal factors have also been found to impact career choice and development. Multiple studies have identified competency beliefs as being the most influential internal factor for career choice and development (Barak, 1981; Bounds, 2017; Brown, 2002; Fisher & Griggs, 1994; Jacobs, 2005; Mau, 2003; Paa & McWhirter, 2000; Sax, 1994; Su, 1997), and other internal factors such as interest, personality, and cultural values have also been identified as influencers of career choice and development (Paa & McWhirter, 2000). Further, subjective factors such as efficacy and perception have been found to influence people of color more than other factors (Fisher & Griggs, 1994).

When specifically examining internal factors that affect the choice to become an educator, perceived ability, intrinsic career value, the ability to shape children's future, social contribution, the ability to work with kids, and the opportunity to enhance social equity have been identified as key influencers of the teaching profession (Bobo et al., 1998; DeLong, 1987; Paa & McWhirter, 2000; Schmitt-Wilson, 2013; Schoon & Parsons, 2002; Tang et al., 2008; Watt & Richardson, 2007). Regarding teachers of color, motivation to impart knowledge, be a role model, and to improve educational conditions for students of color are also key internal motivators for becoming

a teacher (Brown, 2002; King, 1993a). By asking interview participants what aspects of teaching they think are positive, to explain if they have ever considered teaching as a career, and to explain factors that might sway them to consider teaching as career, this study further investigated if and how these internal influencers impact students who identify as people of color's perceptions of teaching as a career.

Due to the large number of factors that influence the development of expectancies and ability beliefs, they are not considered to be static variables; rather, there is a cumulative nature to experiences, social constructs, and contexts (Eccles, 2005; Eccles, 2011) that leads to a complex, unique sequence of experiences that shapes future choices (Eccles, 2009). Simply put, "a person chooses to take on a task (i.e. career or college major) if the person values the task and expects that s/he can succeed at it" (Watt et al., 2017, p. 255). Therefore, because the aim of this study is to understand how the experiences and training received by successful science and math students who identify as people of color in a Metro Atlanta county, EV Theory was used to understand how specific interactions have influenced perceptions of becoming a teacher; the study specifically investigated current perceptions, past experiences, and ability beliefs towards teaching in an effort to identify how recruitment efforts can highlight subjective task values that are aligned with teaching as a career. This was done by utilizing a modified version of the FIT–Choice survey as well as with interview questions directly aligned within the EV Theory framework.

**FIT–Choice Scale.** As part of the case study design, a survey was used to identify participant perceptions of teaching as well as perceptions of an ideal career; this survey is aligned with EV Theory in that the questions were designed to identify key components of expectancies and ability beliefs as part of occupational identity development. When specifically identifying internal factors that influence the choice of whether or not to become a teacher, several common



influencers such as societal contribution, the ability to work with children, the motivation to impart knowledge in a field of interest, and the chance to make a difference in the lives of others have been identified (Brown & Butty, 1999; Curtis, 2012; DeLong, 1987; Fielstra, 1955; King, 1993b; Manuel & Hughes, 2006; Shipp, 1999; Smith et al., 2004; Su, 1997). Utilizing these studies and others, Watt and Richardson (2007) developed the Factors Influence Teaching Choice (FIT–Choice) scale as a way to determine the motivations for selecting teaching as a career. In their work, they determined that perceived ability, intrinsic career value, the ability to shape children’s future, social contribution, the ability to work with kids, and the opportunity to enhance social equity are key influencers of the teaching profession (Watt & Richardson, 2007).

Since its original development, the FIT–Choice scale has been tested for validity and reliability amongst subgroups in various countries including Australia, the Netherlands, Ireland, Switzerland and the United States (Berger & D’Ascoli, 2012; Dundar, 2014; Fokkens–Bruinsma & Canrinus, 2012; Hennessy & Lynch, 2017). Each study has found teaching ability beliefs, the desire to enhance social equity and make a contribution to society, the opportunity to work with children, and positive prior experiences to be the most positively influencing factors for people to choose teaching as a career (Berger & D’Ascoli, 2012; Dundar, 2014; Fokkens–Bruinsma & Canrinus, 2012; Hennessy & Lynch, 2017; Watt et al., 2012). Thus, the FIT–Choice scale and Expectancy Value model are useful in understanding why people pursue teaching as a career as well as their perceptions of the career. Though the survey has been validated numerous times among groups of pre–service and current teachers, it has not been utilized to understand students’ perceptions of teaching as a career. This study used an adapted version of the FIT–Choice scale to determine the general perceptions of both students of color and white students who have been

successful in STEM subjects towards teaching as a career as well as to understand how their perceptions of teaching compare to their perceptions of an ideal career.

### ***Critical Race Theory and Education***

Born as an effort to extend legal scholarship and activism following the civil rights movement (Crenshaw, 1988), Critical Race Theory (CRT) “exposes racism where it is more intractable: at the core of our everyday assumptions and practices” (Litowitz, 1996, p. 511). In the 1970s, Critical Legal Scholarship (CLS) emerged as a movement that aimed to critique formalism and objectivism by insisting that legal doctrine is inherently intertwined with social issues (Unger, 2015). However, CLS failed to recognize the impact of social forces on legal change and discourse, so Critical Race Theory emerged as an attempt to integrate experiential knowledge into moral and situational analysis of the law (Tate, 1997). At the center of CRT is the tenet that racism is endemic, institutional, and systematic (Bell, 1987; Solórzano & Delgado Bernal, 2001). With this are additional ideas based on interest convergence, challenges to claims of the dominant ideology, and the value of experiential knowledge that all aim to understand how legal doctrine is used to substantiate institutional racism (Bell, 1995; Crenshaw 1988; Sleeter, 2016; Solórzano, 1997; Solórzano & Delgado Bernal, 2001)

Within CRT, interest convergence describes how whites may only consider the advancement of people of color as positive when it also converges with advancement for whites (Bell, 1987). One example of this is the questionable gains from *Brown v Board of Education*. At the time, the Supreme Court’s ruling was based on equal rights for African Americans and for the segregation of schools to be abolished; however, the results of this ruling are somewhat questionable because African American communities lost teachers, administrators, and schools which limited their access to high-quality curricula (Bell, 1980; DeCuir & Dixson, 2004). In his

paper, “Brown v Board of Education and the Interest Convergence Dilemma,” Bell (1980) expositis that the Supreme Court had ulterior motives in its decision to end segregation; though some voters may have had purely altruistic motives, it is likely that many white voters also considered benefits to whites such as the continued industrialization of the south and reinforcement of America’s ideal that “all men are created equal” (Bell, 1980). It is these types of legal rulings that CRT aims to examine and change by focusing on interest convergence; CRT seeks to identify the limitations of civil rights laws and bring to light how laws that aim to remedy racial inequality are often undermined through interest convergence (Tate, 1997).

CRT also challenges claims of neutrality, color blindness, and meritocracy by suggesting that these ideas serve to mask white privilege and power (Solórzano & Delgado Bernal, 2001). For example, in 1992, the University of Texas–Austin used a special committee to review African American and Chicana/o student applications in an attempt to increase diversity of the student population. Because nonminority applications were reviewed differently, four white applicants who were denied admission sued the school for violating their equal protection rights under the 14<sup>th</sup> amendment. Though the federal district court refused to bar the school from using race as a part of the application review process, a court of appeals reversed the decision stating that “the University of Texas Law School should not use race to achieve diversity because the 14<sup>th</sup> amendment required state actions in governmental affairs to be color–blind and race–neutral” (*Hopwood v. Texas*, 1994 as cited in Parker, 1998, p. 46). From a CRT perspective, the court’s opinion of the school’s application process reinforces the notion that affirmative action allowed less qualified applicants to gain admission to the school because of their race. Essentially, this ruling and other similar decisions (see *Sweatt v Painter*, 1950) allow whites to maintain racist views, commit acts of discrimination, and for white/dominant privilege to go unchecked (Parker,

1998; Ware, 1998). Therefore, CRT seeks to reveal the “institutional and ideological racial purpose behind the ‘color-blind’ myth of merit and individualism embedded in the anti-affirmative action arguments” (Parker, 2010, p. 48).

CRT’s tenet of experiential knowledge assumes that those who understand racism best are those who are routinely victimized by it and thus values counter stories of people of color that question dominant viewpoints (Solórzano & Yosso, 2002). “The narratives generated [by people of color] serve as a powerful link between historical vestiges of past racism and the effects of what the color-blind perspective omits with its present-day orientation” (Parker, 2010, p. 49), and CRT uses counter stories to help understand how individuals create their own versions of reality (Bergerson, 2003). Historically minoritized groups have much to offer based on their unique experiences, and CRT views this knowledge as strength towards legitimately, appropriately, and critically understanding and teaching the law and its relation to racial subordination (Bell, 1987; Calmore, 1992; Solórzano, 1997). These methods of counter storytelling highlight internal racism and allow for multiple perspectives to be considered by providing a space for minoritized viewpoints to be expressed (DeCuir & Dixon, 2004; Litowitz, 1996); then, researchers can begin to understand how race operates in society and education (Brown, 2014) and to expose racism at an institutional level (Ong et al., 2018). By providing a platform for successful science and math students who identify as people of color to share their counter stories of how their unique experiences have impacted their perceptions of teaching as a career, this study also helps to better understand how racism has been institutionalized in this Metro Atlanta county.

**Teacher Recruitment.** CRT provides a lens for analyzing the whiteness of teacher education and recruitment and for conceptualizing how it might be addressed (Sleeter, 2016). Specifically, CRT can be used to examine educational inequity, curriculum, and access to high–

quality, rigorous education (DeCuir & Dixon, 2004); despite the experiential knowledge and cultural pedagogy that teachers of color bring to education, the idea of “racial tokenism” (Kelly, 2007) only highlights teachers of color’s positive impact as role models for students of color and neglects to mention that teachers of color can be effective for all students (Brown, 2014). Ultimately, race plays a primary role in maintaining inequitable societal relationships, and it is important to consider how norms of whiteness and privilege are re–inscribed in education (Brown, 2014, p. 327). This study examined these inequitable relationships by utilizing counter storytelling in which participants were provided a space to express their experiences as people of color within the unique bounded case of a county in Metro Atlanta; this was done by specifically investigating how schooling experiences in a Metro Atlanta county affected their perceptions of becoming a STEM teacher (Stinson, 2004, 2006).

**Critical Race Theory as an Analytical Framework.** Critical Race Theory (CRT) attempts to reconstruct a hegemonic society by interjecting cultural viewpoints that are derived from a common history of oppression (Barnes, 1990; Parker et al., 1999). Within CRT, scholars can link form and substance using voice and storytelling that allows myths, assumptions, and ideas to be analyzed (Delgado, 1995; Parker et al., 1999). For this study, the utilization of CRT allows better understanding of how participants’ culture has influenced perceptions of teaching in hopes of understanding how to better recruit people of color into K–12 STEM classrooms as teachers. Studies within the CRT framework suggest that people of color have specific knowledge that is important for transforming educational research and practice (Bergerson, 2003; Brown, 2014; DeCuir & Dixon, 2004; Sleeter, 2016), and CRT further supports the case study design of the study because not only do race, gender, and socio–economic status play into experiences of education (Bowleg, 2012; Gillborn, 2015; Parker et al., 1999; Sleeter, 2016), but geographic region also

attributes to specific differences in experiences (Kyansny et al., 2009). Ultimately, the CRT framework allows the study to humanize students of color from “other” by providing a legitimate method for studying racism in schools (Bergerson, 2003; Litowitz, 1996) and allowing the unique knowledge of people of color to be voiced (Brown, 2014; Sleeter, 2016).

### **Summary and Implications**

Application of the theoretical underpinnings of extant literature related to identity and career choice allow this proposed study to add to current literature in informative and important ways because it is unclear whether there is a diversity of perspectives about teaching within and/or across different racial groups (Brown, 2014, p. 333). Additionally, the counter storytelling aspect of this study allows for exploration of the unique experiences and occupational identities of people of color in a Metro Atlanta county to be investigated, and it acknowledges how whiteness continues to operate in education through analysis of the perceptions that participants of color have towards teaching (Brown, 2014; Lee et al., 2017). Though literature exists for how culture and ethnicity influence career choices, little research has been done that includes participants that are not in college (Graham & Erwin, 2011; Lent, 2005), and while some research has addressed the imbalance of people of color in some careers compared to other racial groups, few studies have addressed the issue in teaching (Graham & Erwin, 2011; Smith et al., 2004).

Due to this study’s focus on understanding students of color’s perceptions towards teaching, a theoretical framework comprised of Expectancy Value Theory and Critical Race Theory was used to study how culture influences career perceptions and aspirations. Literature indicates that Expectancy Value models are suitable for comparing achievement-related choices and perceptions within and between cultures (Wigfield et al., 2004), and Critical Race Theory allows researchers to compare similarities and differences from qualitative data while still

accounting for the individuality of people within different cultural constructs (Bell, 1987; Cole, 2009). Within these frameworks, question sets have been heavily tested in different populations, and the literature shows that ability-based questions related to specific tasks give information about future choices of individuals (Eccles et al., 1983; Watt & Richardson, 2007). Additionally, the use of a case study design provides thick description towards identifying important factors that will add to current literature based on understanding the choices of people of color towards whether to pursue STEM education as a career. These include students of color's perceptions of STEM teachers, an analysis of how these perceptions are unique from students who identify as white within the same population, a valid comparison of perceptions of teaching to that of an ideal career, and detailed descriptions of how the unique experiences as people of color have impacted these perceptions. Ultimately, the goal was to determine what factors influence the likelihood of adolescent students of color actively considering teaching in a traditional K–12 STEM classroom as a career choice.

### **Chapter 3: Methodology**

The mixed method design of this dissertation is described in this chapter. The chapter begins with a description of the case study approach followed by a description of the data collection and analysis of the survey instrument and participant interviews.

#### **Methodological Framework: Case Study**

To fully understand students of color's perceptions of becoming a STEM teacher, a case study approach (Merriam, 1998) with embedded subunits (Yin, 2014) was utilized. Case-studies are used to provide in-depth understanding of a specific bounded case (Creswell & Poth, 2018), and Merriam views case-studies as being particularistic, heuristic, and descriptive (Merriam, 1998; Yazan, 2014). A case study was more suitable for this study than a narrative or phenomenological study because the researcher was interested in the general feelings of a unique group rather than specific individuals, and though this group lives in the same region, this study was not concerned with a specific, common lived experience (Creswell, 2007). Rather, this study sought in-depth understanding of the concrete level of the career decision process towards whether or not to become a STEM teacher for adolescents of color, so a case study was deemed most appropriate (Yin, 2014); the focus on "why" and inability to manipulate how the participants perceive teaching makes a case study applicable for better understanding this phenomenon (Yin, 2014).

The specific bounded case consisted of students of color who have demonstrated academic strength in science and math in a Metro Atlanta county, but students who identify as white were also included in the survey sample as a means of comparison. The embedded subunits of the case included juniors from one public high school and freshmen and seniors from one public university. These schools in the county were specifically chosen due to their unique representation of multiple



racess which provides for unique experiences amongst people of color within the population (Phinney, 2000; Wigfield et al., 2004) as well as for their ease of access to the researcher. The population at the selected high school has approximately 74% students of color, and the selected public university is approximately 44% students of color. When compared, the population of the schools in this case study are more ethnically diverse than both the state of Georgia and the United States (US Census Bureau, 2017) making the population unique. Further, the specific age groups being investigated were chosen because adolescence is the time period when key educational and occupational choices are considered and made (Wigfield & Eccles, 2000). By utilizing Expectancy Value and Critical Race Theory, the study aimed to ensure the voices of participants were heard as individuals, and the results of this study can be used to inform current literature on how changes can be planned to increase the representation of people of color in STEM classrooms and STEM careers.

### ***Ontology and Epistemology***

For this case study, the researcher brings a transformative worldview in order to understand the perceptions of students of color towards becoming a STEM teacher. Transformative approaches to qualitative research seek to reject cultural relativism by recognizing that various versions of reality are based on social positioning (Creswell, 2007), and the researcher believes that “knowledge is not neutral” because it reflects social relationships within society (Creswell & Poth, 2018, p. 25). Within this paradigm, the main goal is to draw on the strengths of participants’ lived experiences in order to challenge reproductions of inequality (Giroux, 1992; Mack, 2010). Additionally, Mertens (2010) suggests that studies within the transformative worldview study both marginalized and dominant groups in order to fully understand the way oppression is structured and reproduced (Kelly et al., 1994).

The ontological viewpoint of the transformative worldview is that social reality is defined from persons in society and that multiple versions of what is perceived to be real should be recognized (Mertens, 2010, p. 9). Ultimately, the transformative worldview stresses the acceptance of differences of perceptions as being equally legitimate. The epistemological viewpoint of the transformative worldview is that knowledge is produced by and is an expression of power rather than truth (Mack, 2010, pp. 9–10); with this, transformative research centers the meaning of knowledge as being defined by cultural lenses (Mertens, 2010, p. 32), and therefore, studies should examine ways that research benefits or does not benefit the participants (Kelly et al., 1994).

### **Research Questions**

Current research shows that teachers who “cultivate safe, respectful, culturally sensitive, and responsive learning communities” are valued by students (Sleeter, 2016, p. 9) and that student achievement levels increase when their teachers share similar racial, cultural, and/or linguistic backgrounds (Achinstein et al., 2010; Dilworth & Brown, 2008; Duncan, 2010; Villegas & Davis, 2008). These studies and others indicate that teachers of color need to be recruited (Achinstein et al., 2010; Guyton et al., 1996; King, 1993a; Quirocho & Rios, 2000; Sleeter & Milner, 2011), but preservice teachers have and continue to be exaggeratedly white (Sleeter, 2016).

As a teacher, I have witnessed students who have a love for working with and teaching students, but they rarely consider choosing teaching as a profession. Therefore, due to personal experiences and the need for increased diversity within STEM classrooms, the purpose of this study is to reach a deep understanding of the factors that affect high school and college students of color’s choices in whether to enter the education career field as a teacher in a K–12 traditional STEM classroom setting. Further, this study will also contribute to the body of literature that exists on understanding how people of color choose various career paths. Using Expectancy Value

Theory and Critical Race Theory as theoretical frameworks, the following research question was generated:

- How do the experiences of successful STEM students who identify as people of color influence their perceptions of a career as a STEM teacher?

Specifically, this study looked at a bounded case in one county in the Metro Atlanta area in order to address the following secondary research questions:

- Is there a statistical difference between perceptions of teaching and perceptions of an ideal career for students who identify as people of color?
- Is there a statistical difference of perceptions of teaching between students who identify as people of color when compared to the perceptions of students who identify as white when considering current level of schooling?
- How have the unique experiences of students in this county who have shown strength in science and math and who identify as people of color influenced their perceptions of teaching?

The primary and secondary research questions are justified as Lent, Hackett, & Brown (1999) call for researchers to study the school–work transition experiences of diverse groups, and Lent (2005) highlights the sparsity in the literature in terms of the driving factors in multicultural vocational choices. Additionally, though literature exists for how culture and ethnicity influence career choices, little research has been done that includes participants that are not in college (Lent, 2005). Lastly, while some research has addressed the imbalance of people of color in some careers compared to other racial groups, few studies have addressed the issue in teaching (Graham & Erwin, 2011; Smith et al., 2004), and it is unclear whether there is a diversity of perspectives about teaching within and/or across different racial groups (Brown, 2014, p. 333). This study contributes

to the body of literature that exists on understanding how people of color choose various career paths.

### **Context of Study**

The specific bounded system under study consisted of students who identify as people of color that have demonstrated academic strength in science and math; the embedded subunits included students from one high school and one public university in a county in the Metro Atlanta area. The schools in this county were chosen due to their diverse populations and unique representation of people of color which lead to unique experiences that should be investigated (Phinney, 2000). This study specifically investigated perceptions of high school juniors and current college students because these are the stages of adolescence in which choices regarding occupations are most heavily considered (Wigfield & Eccles, 2000), and students who identify as white were included in the survey sample as a means of comparison of general perceptions (Kelly et al., 1994; Mertens, 2010). The population at the selected high school is 38% African American, 19% Hispanic, 26% white, 13% Asian, and 2% multiracial. The school's population is 54% male and 46% female, and both were represented in this study. Further, 67.5% of the total population enrolls in a 4-year college degree program after high school graduation, 13.6% enroll in a 2-year degree program, and 3% join the military. For this high school, the average ACT composite score is 23.4; the average ACT math score is 22.6; and the average ACT science score is 23.4. The average SAT score is 1196 where the average score on the SAT math is 598. Notably, the ACT composite, ACT math and science, SAT total, and SAT math scores are all above the average for the entire county, the state of Georgia, and the nation (Georgia Department of Education [GaDOE], 2020). Additionally, the school currently offers 27 different advanced placement (AP) courses to students in grades 9–12.

This study also included students from a public university located in the same Metro Atlanta county. Undergraduate students currently in their first or final years at the college were included. This school has approximately 32,000 undergraduate students; the population is 21% African American, 9% Hispanic, 57% white, 5% Asian, and 8% other or multiracial. The school's population is 52% male and 48% female, and both were represented in this study. For accepted applicants, the average high school GPA is 3.32, the average SAT math score is 575, and the average composite ACT score is 24.

### **Participants**

Prior to the study, an a priori power analysis was conducted using GPOWER Analysis (Erdfelder et al., 1996) to determine an appropriate sample size for the survey participants (Cohen, 1988). The analysis indicated that to achieve a power of 0.80 with a  $p < 0.05$  and a medium effect size of 0.25 across two groups with two degrees of freedom, a sample size of 158 would be required (Erdfelder et al., 1996; Huck 2012). Based on an average response rate of approximately 50% for academic surveys (Baruch, 1999; Baruch & Holtom, 2008), the sample size was increased to 150 high school juniors and 400 college students; this resulted a total of 287 responses which is an overall response rate of 52%. Of these 287 survey responses, purposeful criterion sampling was then used to identify 180 survey participants that met a level of success for math and science if currently in high school or who had chosen a STEM science major if currently in the identified age subgroups for college. Of the chosen participants, 47 were juniors in high school, 69 were freshmen in college as indicated by a matriculation date of Fall 2019, and 64 were college students in their graduating semester as indicated by the completion of 90 or more credit hours at the university. Additionally, 109 participants identified as people of color including Black/African

American, Hispanic/Latinx American, Asian, Pacific American, or American Indian (Marable, 1992; Solórzano, 1997) while 71 identified as white (Table 1).

**Table 1**

*Demographics of Surveyed Participants*

<b>Demographic</b>	<b>Person of Color</b>	<b>White</b>	<b>Total</b>
Senior in College	30	34	64
Freshman in College	50	19	69
Junior in High School	29	18	47
<b>Total</b>	109	71	180

Of those who completed the survey, common ideal careers that were mentioned included doctor (70), engineer (14), scientist (15), dentist (12), computer science (14), nurse or physician's assistant (7), pharmacist (8), veterinarian (6), and psychiatrist (6). Others also mentioned careers in accounting, public policy, physical therapy, and a few were undecided. Additionally, academic achievement of participants was collected through reporting of GPA and standardized test scores. Of the junior participants, the average ACT math, ACT science, and SAT math scores were 31.2, 32.6, and 716, respectively, all of which are higher than the school's average. Additionally, the median GPA for the surveyed population was 3.58 with an average of 3.49 on a 4.0 score (Table 2).

**Table 2**

*Participant GPA by Ethnicity and Education Subgroup*

<b>Education Subgroup</b>	<b>Person of Color</b>	<b>White</b>	<b>Total</b>
Senior in College	3.26	3.54	3.41
Freshman in College	3.55	3.62	3.57
Juniors in High School	3.49	3.49	3.49
<b>Total</b>	3.45	3.55	3.49

### ***Consent and Confidentiality***

Before the study began, IRB approval was obtained from both the public university and the school district for the public high school. Once approved by both boards, the purposefully chosen potential participants from each group who were under the age of 18 were asked to have a parent complete a consent form giving their permission for their student to participate in the study. Once parental consent forms were collected, participants who were under the age of 18 completed assent forms for the study, and those over the age of 18 completed an online consent form. Then, the participants who consented to be a part of the study completed the survey. Additional consent forms were also provided to participants who agreed to participate in the interview stage of the study. For participants under the age of 18, additional parental consent was obtained prior to the student's assent to participate in the interviews.

### ***Risks and Benefits***

Some risk may have been attributed to the stress that students may have experienced while discussing college and career choices. Discussing a college degree and/or career path may be stressful because students may fear judgement from adults, feel unprepared to discuss their choices, or they may feel pressure from the uncertainty of their choices. Benefits included gaining insight about the factors that influence students of color's career choices and decisions about entering education as a K–12 STEM teacher.

### ***Data Collection***

Data was first collected using a three-part survey that was distributed electronically to participants (Appendix 1. Survey); the survey aimed to illuminate the general perceptions of successful STEM students towards teaching as well as towards an ideal career. The survey results were further used to compare general perceptions of teaching and of an ideal career between

students who identify as people of color as well as to determine if there were differences in perceptions among these students, students who identify as white, and within the education subgroups. The first section of the survey asked participants demographic and education-based information. The second part of the survey then aimed to understand student perceptions of STEM teachers by using an adaptation of Watt and Richardson's FIT-Choice scale (2007; Appendix 1. Survey). For this portion of the survey, the original FIT-Choice scale was adapted to only include the perceptions section of the original survey due to the focus of this study (Watt & Richardson, 2007); this part of the survey included 13 questions that asked participants to use a 7-point Likert scale ranging from *not at all* to *extremely* to describe to what level they agreed with specific statements regarding STEM teachers; the statements were divided into 5 factors that specifically targeted perceptions of level of expertise, on the job demand, morale, social status, and salary of STEM teachers. The third section of the survey was also based on the questions from the FIT-Choice scale, but it aimed to understand participants' perceptions of an ideal career based on Eccles et al. Expectancy Value framework (1983; Palumbo et al., 2008; Watt & Richardson, 2007; Appendix 1. Survey). This part of the survey included 13 parallel questions to part 2 of the survey, but they were modified to ask perceptions of the same 5 factors of professionals in an ideal career rather than of STEM teaching.

After survey data was collected, 2 to 3 participants who identify as people of color were chosen from each education-level subgroup for an interview. These participants were chosen using psychobiography intensive purposive sampling to ensure those interviewed presented a unique perspective of experiences as students of color in the Metro Atlanta county (Table 3; Palinkas et al., 2015; Palys 2008; Robinson, 2014). All interviews were conducted at a central location on the



college and/or high school campus in order to provide comfort and privacy for participants; some interviews were also conducted over the phone to best meet the needs of the participants.

**Table 3**

*Description of Interviewed Participants*

<b>Participant</b>	<b>Education Subgroup</b>	<b>Race / Ethnicity</b>	<b>Intended / Chosen Major</b>	<b>Ideal Career</b>
1	Junior in	African American	Nursing	Nurse
2	High	Hispanic	Business	Architect
3	School	Asian	Biology	Medical Doctor
4	Freshman	African American & Hispanic	Biology	Medical Doctor
5	in College	Asian	Chemistry	Dentist
6	Senior in	Asian	Chemistry	Medical Doctor
7	College	Hispanic	Public Health	Medical Doctor

The interviews were semi-structured and used a set of questions developed from validated question types found within the frameworks of this study (

Appendix 2. Interview Protocol). Questions (f), (g), (h)–(n) were developed within Expectancy Value Theory (Eccles et al., 1983; Watt & Richardson, 2007;

Appendix 2. Interview Protocol) and aimed to discover if participants had ever considered teaching, their ideas of positive and negative aspects of the teaching profession and of their ideal career, and beliefs about teachers' and professionals in their ideal career field's expertise, day to day job demands, social status, morale, and salary; questions (e), (o), (p), (q), and (r) were developed within the Critical Race Theory framework (Stinson, 2004, 2006) in order to provide an opportunity for counter storytelling through thick description of how experiences as a student who identifies as a person of color in this Metro Atlanta county have influenced their perceptions of teaching (

Appendix 2. Interview Protocol). The interviews aimed to provide in-depth description of the findings from the perceptions survey as well as to validate the modified survey via triangulation of survey responses and interview data. Each interview was audio recorded, important notes and impressions were documented by the interviewer during and after the interview, and recordings were transcribed for coding using GoTranscript.

## **Data Analysis**

### ***Survey Data***

Data from the survey portion of the study was imported into SPSS for analysis. The analysis aimed to uncover participants' perceptions of STEM teachers as well as how these perceptions compared to those of their ideal careers. Responses from the first section were used to analyze data based on age and ethnic / racial group identification, and data from the second and third sections of the survey based on the FIT-Choice scale was analyzed to determine where perceptions of teaching and perceptions of the ideal career were similar and different between groups represented in the study.

An overall composite score was calculated for perceptions of STEM teaching and for perceptions of an ideal career. Additionally, the average ranking for each statement as well as the average ranking within each survey factor investigated for both perceptions of STEM teachers and perceptions of an ideal career was calculated. To examine the difference between the perceptions of teaching and perceptions of an ideal career for students of color, a two-tailed dependent sample t-test was conducted at an alpha level of 0.05 which reduces the likelihood of Type 1 and II errors (Huck, 2012;

Table 4). A two-way ANOVA was also conducted to better understand differences in perceptions of teaching based on race/ethnicity and education subgroup (Huck, 2012;

Table 4). For the two-way ANOVA, the independent variables were race/ethnicity (person of color or white) and education level subgroup (junior in high school, freshman in college, or senior in college), and the dependent variable was composite score for the perception of teaching. An a priori power analysis was conducted to estimate the number of participants needed to obtain a statistical power of 0.80 at an alpha level of 0.05.

**Table 4***Survey Data Analysis*

Question	Variable 1	Variable 2	Variable 3	Statistical Test
Is there a statistical difference between perceptions of teaching and perceptions of an ideal career for students who identify as people of color?	Perceptions of teaching	Perceptions of ideal career	X	Dependent Sample T-Test
Is there a statistical difference between perceptions of teaching between students who identify as people of color when compared to the perceptions of students who identify as white when considering current level of schooling?	Perceptions of teaching	Race / Ethnicity of Participant	Education level subgroup	2-Way ANOVA

*Interview Data*

Due to its ability to show interconnectedness of qualitative data, NVivo software was used to code interview responses in order to identify themes, patterns, similarities, and/or differences between the education-level subgroups. Because the interview questions were broken into subcategories based on Expectancy Value Theory and Critical Race Theory, each subset of questions was coded separately before being analyzed collectively to determine overarching themes of the study.

Interview questions (f), (g), (h)–(n) (

Appendix 2. Interview Protocol) were open and axially coded as well as provisionally coded using themes within EV Theory to further understand perceptions based on professionals' level of knowledge, on the job demand, morale, social status, and salary (Appendix 3. Codebook for Qualitative Data; Eccles et al., 1983; Saldaña, 2016; Watt & Richardson, 2007). These responses were also selectively coded to identify whether these statements were positive or negative and whether they related to teaching or an ideal career. This coding specifically aimed to provide in depth understanding of the participants' perceptions of STEM teaching, their ideal career, and the comparison of the two within the Expectancy Value Theory framework. Questions (e), (o), (p), (q), and (r) (



Appendix 2. Interview Protocol) were axially coded so that participants' beliefs and understandings as students who identify as people of color could be described (Saldaña, 2016). Then, domain and focused coding (Saldaña, 2016) were used to identify themes within the tenets of Critical Race Theory which allowed for deeper understanding of how experiences as a student who identifies as a person of color in this Metro Atlanta county have influenced these perceptions (Appendix 3. Codebook for Qualitative Data).

Once interview data was coded within each question subset, the codes were analyzed again through holistic coding in order to determine broader categories and themes within the population (Saldaña, 2016). This final analysis aimed to provide in-depth description of how experiences of students in this county who both identify as people of color and have been successful in science and math have impacted their perceptions of choosing to become a STEM teacher; quantitative and qualitative analyses were ultimately integrated in order to provide an in-depth understanding of participants' perceptions of STEM teaching, their ideal career, and the comparison of the two.

### **Strategies to ensure Trustworthiness**

#### ***Credibility***

In order to ensure credibility, this study used surveys and interview questions developed from the Expectancy Value and Critical Race theoretical frameworks (Eccles et al., 1983; Stinson, 2004; Watt & Richardson, 2007). These questions were validated across multiple studies for use in understanding perceptions of teaching as a career regarding achievement-related choices and experiences as a person who does not belong to the societal dominant group (Berger & D'Ascoli, 2012; Brown, 2014; Dundar, 2014; Fokkens-Bruinsma & Canrinus, 2012; Hennessy & Lynch, 2017; Sleeter, 2016; Stinson, 2004, 2006; Watt et al., 2012). Additionally, a case study design was

used which is not only a well-recognized research method, but it also helps ensure credibility via triangulation of survey responses and coded interview data.

During the interviews, precautions were taken to help ensure honest answers by conducting the interviews in a common, public area with few distractions that was familiar to the participants; further, student participants were selected from those who were not currently being graded by the investigator in order to reduce bias in answers. The questions in the interview protocol were all developed within well-established frameworks and were open ended, so participants were not led to answers. During the interviews, the researcher sought confirmation or disconfirmation of what was believed to have been heard in order to effectively engage in simultaneous data analysis (Glesne, 2016), and once interview data was coded and analyzed, the interviewees were asked to read and respond to the analysis as a form of member checking in order to be sure the analysis was an accurate portrayal of the interview (Glesne, 2016); all interviewed participants agreed with the interview data analysis. Additionally, interviews and survey responses were compared to help ensure study validity and reliability for this population, and examination of previous research helped frame the findings while thick description was used for in-depth explanation of the phenomenon being studied.

### ***Transferability and Dependability***

This study used naturalistic generalization by providing background data of participants regarding race, level of education attained, ACT/SAT scores, college major, and GPA. Further, context of the current demographics of STEM teachers has been provided for additional detailed description of the phenomenon in question. Additionally, this study is considered dependable due to the detailed methods for sample selection as well as to the use of validated instruments which both allow the study to be replicated in a similar setting.

For the qualitative data, one full interview was chosen to also be coded by a secondary researcher in order to demonstrate interrater reliability; an average Cohen's kappa of 0.78 was found across all coded nodes after one round of coding. This indicates excellent agreement (NVivo, 2018) and thus strong reliability in the coding of the data. Additionally, interview analysis was sent to participants as a form of member checking, and all interviewed participants agreed with the analysis. Finally, overlapping methods of survey data and interview responses helped increase the dependability of the study via triangulation.

### ***Confirmability***

In order to ensure confirmability of the study, the researcher explicitly stated and justified the transformative worldview approach thus admitting her personal beliefs and assumptions. This helps provide context for methodologies and data analysis. Additionally, triangulation of interview responses via interrater reliability and member checking helped reduce the effect of investigator bias. Also, participants were selected from those who were not currently being graded by the investigator in order to reduce bias in answers. Last, any potential limitations such as a localized area of study were explicitly addressed and justified in order to diminish their possible impact. However, the in-depth description of methodologies also helps decrease the possible defects of the study by increasing the integrity of the research results.

### ***Validity and Reliability***

The original authors of the FIT-Choice survey reported Cronbach's alpha measures of internal consistency as being high (between .90 and .97), and construct validity was demonstrated with exploratory factor analysis revealing pattern coefficients from .56 to .95 for items on their respective factors (the 5 investigated in this study are expertise, high demand, social status, teacher morale, and good salary; Watt & Richardson, 2007). Additionally, confirmatory factor analysis of

the original survey across two independent samples resulted in alpha values ranging from .68 to .92, further indicating both convergent and divergent validity of the survey (Watt & Richardson, 2007). The method of using a parallel survey to measure perceptions of careers was validated by Palumbo et al. (2008) in that no significant differences were found in internal consistency and validity measures when “new instruments identical to the original” were edited to simply ask about additional or different professions (p. 9). Therefore, part 3 of the survey used in this study can be assumed to carry similar measures of internal consistency and convergent and divergent validity as part 2 of the survey used in this study.

## **Chapter 4: Findings**

The purpose of this chapter is to present the findings of the data collected in this case study. The evidence will be presented to answer the research question: How do the experiences of successful STEM students who identify as people of color influence their perceptions of a career as a STEM teacher? This chapter will first discuss the findings of the survey as they relate to the secondary research questions: (1) Is there a statistical difference between perceptions of teaching and perceptions of an ideal career for students who identify as people of color? and (2) Is there a statistical difference of perceptions of teaching between students who identify as people of color when compared to the perceptions of students who identify as white when considering current level of schooling? The second portion of this chapter will discuss the findings of interviews as they relate to the secondary research question: How have the unique experiences of students in this county who have shown strength in science and math and who identify as people of color influenced their perceptions of teaching? The chapter concludes with a synopsis of major findings as it relates to how experiences of successful STEM students of color influence their perceptions of a career as a STEM teacher.

### **Survey Analysis: Comparison of Perceptions**

#### ***Descriptive Statistics***

Data from the survey portion of the study was imported into SPSS for analysis. The analysis aimed to uncover participants' perceptions of STEM teachers as well as how these perceptions compared to those of their ideal careers. Responses to the first section of the survey were used to analyze data based on ethnic and racial group identification, and data from the second and third sections based on the FIT–Choice survey was analyzed to determine where perceptions

of teaching and perceptions of the ideal career were similar and different between groups represented in the study.

Purposeful criterion sampling was used to identify 180 survey participants that met a level of success for math and science if currently in high school or who had chosen a science major if in the identified education subgroups for college (Table 1). An overall composite score was calculated for perceptions of STEM teaching as well as for perceptions of an ideal career across the entire surveyed population. Based on the survey, the highest possible composite score for either career perception was 91 which would indicate that participants *extremely agreed* with each statement made. For the entire population (N = 180), the average score for perceptions of STEM teaching was 49.72; when adjusting this to the 7-point Likert scale used on the survey, this equates to an average choice of 3.82 which is between *slightly agree* and *neutral* for each statement made about STEM teachers. Comparatively, the average score for perceptions of an ideal career was 63.99; this can be adjusted to an average choice of 4.91 which is between *neutral* and *moderately agree* (Table 5). The researcher assumed that the majority of those participating in the survey were not considering teaching as a career; therefore, the higher composite score for ideal career was expected, but the results were further explored in order to better understand where and why perceptions differed for the career choices and whether these differences were statistically significant.

**Table 5**

*Average Rank of Statements for Surveyed Population*

<b>Statement</b>	<b>STEM Teaching</b>	<b>Ideal Career</b>
Salary	2.39	4.91
Demand	4.43	5.07
Social Status	3.95	5.10
Morale	3.58	4.60
Expert	4.65	5.27
<b>Composite Score</b>	49.72	63.88

When examining the composite scores by latent factors identified by exploratory and confirmatory factor analysis by the original authors (Watt & Richardson, 2007), it was seen that not only was the average composite score for participants' perceptions of an ideal career higher, but the participants also had more positive perceptions of their ideal career for all five latent factors than they did for that of STEM teaching (Table 5). More specifically, the largest score differences existed when comparing perceptions of salary and social status. This was expected as the majority of identified ideal careers were doctors (70), scientists (15), and engineers (14); it is also consistent with literature that says generally, people believe teachers are not paid nor respected enough (Curtis, 2012; Shipp, 1999; Watt & Richardson, 2007), and interview responses indicated the social status is associated with salary as is expected (Weiss & Fershtman, 1998). However, participants also described social status as being a factor of how others respect people in those professions. Interestingly, the smallest difference in composite perceptions were found to be in the latent factor of demand; this indicates that despite not thinking highly of teaching as a career, participants likely do think the demands of teaching are comparable to those of their ideal career. Due to the study's focus on understanding perceptions of people of color as well as how these perceptions change with race/ethnicity and age, additional statistical analysis was conducted.

### *Assumptions Testing*

To avoid misleading or inaccurate results, Huck (2012) suggests testing assumptions of respective statistical tests (i.e. t-test and two-way ANOVA for this study). For the survey data, the assumptions of randomness and independence of observations were ensured in the methods used for data collection. However, t-tests and two-way ANOVA also require that data have no outliers, be normally distributed, and that there is equal variance within the samples (Huck, 2012). When conducting Shapiro-Wilk (Huck, 2012; Yap & Sim, 2011) **Error! Reference source not**

**found.**) and Levene's Test of Equal Variance on the original survey population, it was determined that the data was not normally distributed ( $W(179) = 0.000$ ) nor was there equal variance ( $F(5,174) = 0.000$ ) at the  $p = 0.05$  level. To address these issues, extreme values and outliers were removed; then, to obtain more balanced strata, data was randomly removed from the "Senior in College, White" and the "Freshman in College, Person of Color" groups to reach more balanced cell sizes while maintaining a sample size of at least 158.

Then, tests of normality and equal variance were conducted on the new sample. Shapiro–Wilk results indicated that composite scores for perceptions of teaching were normally distributed for the entire population ( $W(157) = 0.057$ ,  $p = 0.05$ ) as well as for participants who identify as people of color ( $W(92) = 0.324$ ,  $p = 0.05$ ), and equal variances were also assumed based on the results of the Levene's Test ( $F(5,152) = 0.251$ ,  $p = 0.05$ ). However, the Shapiro Wilk test of composite scores for perceptions of an ideal career for participants who identify as people of color still revealed that the normality assumption for this dependent variable was not met ( $W(92) = 0.002$ ,  $p = 0.05$ ). Because no further data could be removed while maintaining statistical power, log and square root data transformations were conducted to see if this would remedy the normality issue (Huck, 2012); with this, both data transformations still resulted in data that was not normally distributed ( $W(92) = 0.000$ ,  $p = 0.05$  for both tests). The sample that was further investigated is represented in



Table 6.**Error! Reference source not found.**

**Table 6***Adjusted Demographics of Surveyed Participants*

<b>Demographic</b>	<b>Person of Color</b>	<b>White</b>	<b>Total</b>
Senior in College	30	28	58
Freshman in College	34	19	53
Junior in High School	29	18	47
<b>Total</b>	93	65	158

*Comparison of Perceptions of Teaching to Perceptions of an Ideal Career*

Because the assumption of normality was not met for the composite scores of the perceptions of an ideal career for participants who identify as people of color, a nonparametric version of the dependent samples t-test was conducted (Huck, 2012). The descriptive statistics indicated that the composite perceptions of an ideal career ( $M=64.17$ ) were more positive than the composite perceptions of teaching ( $M=48.71$ ), so the Wilcoxon Signed Ranks Test was used to assess whether perceptions of teaching and of an ideal career were significantly different for the participants in the study who identify as people of color ( $N=93$ ). The results revealed a statically significant difference in perceptions of teaching and of an ideal career ( $Z = -7.832, p < 0.005$  [two-tailed]);

Table 7) with participants in this study who identify as people of color having statistically lower perceptions of STEM teaching as a career than they do perceptions of their ideal careers. Comparatively, the average composite score for participants who identify as white was 49.52 for STEM teachers and 62.03 for an ideal career. This indicates that not only do the participants of color have a slightly more negative view of STEM teaching when compared to their white counterparts, but the participants of color also perceive their ideal careers more positively. This

was further supported in the interviews as participants felt that teaching would not fit their personalities but also claimed that people should only choose jobs that make them happy.

When looking more closely at the descriptive statistics of the latent variables for participants who identify as people of color, the largest difference in perception is seen for salary where on average, perceptions of an ideal career's salary received a ranking of 2.63 points higher on the 7-point scale (

Table 7). Large differences were also seen in perceptions of social status and morale which many of the interviewed participants related back to low salary. For example, when asked about the social status of teachers, three of the interviewed participants said that because teachers are not paid a lot, they have a low social status in the community. Further, while many of the interviewed participants thought that teachers are generally happy with what they do, a few also mentioned that "not being paid for the work they do" might result in low morale for the profession overall.

**Table 7**

*Average Rank of Statements for Participants of Color*

<b>Statement</b>	<b>STEM Teaching</b>	<b>Ideal Career</b>
Salary	2.42	5.05
Demand	4.39	5.19
Social Status	3.99	5.23
Morale	3.64	4.75
Expert	4.70	5.34
<b>Composite Score</b>	<b>48.71</b>	<b>64.17</b>

Interestingly, the smallest difference in composite perception scores for participants who identify as people of color was for statements relating to experts in the career field. Though the average rank for ideal career was 5.34, the average rank for teachers was only 0.64 points lower, indicating that people of color do believe that teachers are experts in their careers. This was somewhat supported in interviews when the majority of participants mentioned that because

teachers are required, at minimum, to have a bachelor's degree, they should be considered experts. However, interviewees further explained that "expert" is somewhat subjective because they didn't necessarily consider all teachers to be experts in their subject matter. For example, multiple participants reflected that they had secondary teachers who they felt were not qualified to teach AP level content and therefore should not be considered experts. Additionally, one participant stated that teachers are experts "sometimes" and went further to explain:

*I know some professors who have a master's in chemistry, so I think those are experts in their field, but then there's some professors who have a chemistry education degree, and I'm not quite sure if that makes them necessarily an expert. I think in teaching specifically, then, yes, I think they're experts.*

#### ***Perceptions of Teaching: Comparison between Race/Ethnicity & Education Subgroup***

When examining the data by race / ethnicity, the data revealed that participants who identify as people of color generally had a slightly lower perception of teaching than their white counterparts (Table 8). This was true for both college education subgroups, but participants of color who were juniors in high school had a slightly higher perception of the career. Overall, this is inconsistent with literature that indicates that people of color oftentimes think more highly of teachers and are more likely to consider teaching as a career due to the opportunity to give back (Barrant et al., 2002; Su, 1997). Part of the reason for this could be this study's unique population which leads to unique perceptions based on individual experiences (Bounds, 2017; Bowleg, 2012; Eccles, 2009; Gillborn, 2015; Kyansny et al., 2009; Lent & Brown, 1996; Parker et al., 1999; Sleeter, 2016); additionally, this data further supported the study's choice to interview purposefully chosen participants who identify as people of color in order to better understand the perceptions within this bounded case.

When further examining perceptions of teaching by education subgroup, freshmen in college ( $N = 53$ ) had the highest average composite score of 52.55 followed by juniors in high school ( $N = 47$ ) with an average of 47.49, and seniors in college ( $N = 58$ ) had the lowest average composite score with an average ranking of 47.10 (

**Table 9)** which may be explained by the fact that they are in their late schooling and have already chosen a career other than teaching. When further examining the descriptive statistics based on education subgroups, it was found that the largest score differences existed between perceptions of salary, social status, and expertise.

**Table 8**

*Survey Composite Scores for Perceptions of STEM Teaching*

Education Subgroup	Race/Ethnicity	Mean	SD
Senior in College	Person of Color	45.60	9.782
	White	48.71	8.520
	Total	47.10*	9.248
Freshman in College	Person of Color	52.21	7.168
	White	53.16	6.457
	Total	52.55*	6.874
Junior in Highschool	Person of Color	47.83	9.060
	White	46.94	10.367
	Total	47.49*	9.480
Total	Person of Color	48.71	9.027
	White	49.52	8.773
	Total	49.04	8.905

*Note.* Asterisks (\*) indicate significant difference exists based on results of two-way ANOVA ( $p < 0.05$ )

**Table 9***Average Rank of Statements based on Education Subgroup*

<b>Statement</b>	<b>Senior in College</b>	<b>Freshman in College</b>	<b>Junior in High School</b>
Salary	2.10	2.80	2.18
Demand	4.35	4.54	4.34
Social Status	3.71	4.32	3.67
Morale	3.32	3.87	3.39
Expert	4.38	4.93	4.60
<b>Composite Score</b>	47.10	52.55	47.49

To further investigate these relationships, a 2 X 3 two-way ANOVA was run using the independent variables of race/ethnicity (person of color or white) and education level subgroup (junior in high school, freshman in college, or senior in college) with the dependent variable of composite perception of teaching to an alpha level of 0.05 and power of 0.80 (

Table 10). There was no main effect of race/ethnicity ( $p > 0.100$ ) nor was there an interaction between education subgroup and race/ethnicity ( $p > 0.500$ ), but this analysis did reveal a significant main effect of education subgroup,  $F(2,152) = 6.543$ ,  $p < 0.005$ , such that participants who were freshmen in college reported a significantly more positive perception of teaching ( $M = 52.55$ ,  $SD = 6.874$ ) than those who were seniors in college ( $M = 47.10$ ,  $SD = 9.248$ ) or juniors in high school ( $M = 47.49$ ,  $SD = 9.480$ ). A Tukey post hoc multiple comparison of means revealed significant mean differences between freshmen in college and seniors in college ( $p < 0.005$ ) as well as between freshmen in college and juniors in high school ( $p < 0.05$ ), and the effect size between freshmen in college and seniors in college ( $d = 0.6$ ) was greater than the effect size between freshmen in college and juniors in high school ( $d = 0.5$ ) indicating a slightly stronger relationship in the transition between freshman year in college to senior year in college. However, there was no statistical difference between seniors in college and juniors in high school ( $p > 0.05$ ).



**Table 10***Results of Two-Way ANOVA*

<b>Source</b>	<b>SS</b>	<b>df</b>	<b>MS</b>	<b>F</b>	<b>p</b>
Education Subgroup (Ed)	973.393	2	486.697	6.543	.002
Race/Ethnicity	42.021	1	42.021	.565	.453
Ed X Race/Ethnicity	101.953	2	50.976	.685	.505
Within Groups (Error)	11306.082	152	74.382		
Total	392493.000	158			

The results of the comparison based on education subgroup are particularly interesting because the general perception of teaching as a career was highest for freshmen in college indicating that while the general perception of the career increases during the transition from high school to college, the general perception then decreases again through the years in college. This can be somewhat explained by Marcia's (1966) definition of ego-identity status that describes four different statuses based on how crisis and commitment combine towards occupational choice. Literature indicates that high school juniors may identify as being in the achievement status of occupational identity development because they have committed to a major / career based on the crises they have experienced or that they are experiencing occupational foreclosure as they plan to enter a career based on the expectations of others (Archer, 1982; Kroger et al., 2010; Marcia, 1966). This was supported in interview responses when the high school juniors explained that though they were choosing careers based on their interests in helping others, they were also being influenced by their parents/guardians with one junior saying, "Well, there's definitely some pressure from my parents [to become a doctor]."

However, literature also indicates that adolescents are likely to transition into the moratorium status during the first year of college as during this stage of identity development, students are undergoing an active struggle to make a commitment to an occupation because they must make a compromise between individual aspirations and what parents or other external

influencers wish for them (Kroger et al., 2010; Marcia, 1966). Thus, freshmen in college may be more fluid in their career choices as they are undergoing active exploration due to their new environment. This was somewhat supported in the interview responses as freshmen in college were less adamant to say “No” when asked if they have considered teaching, and they discussed fewer extreme changes to the career when asked what would make them consider it. Then, the more negative perceptions of teaching for seniors in college may be indicative of these students re-attaining the achievement status of development. During the college years, students experience additional crises as college is a time of potentially volatile changes in identity (Robinson et al., 2018), but the number of students in identity achievement status rises over late adolescence and into young adulthood (Kroger et al., 2010). Therefore, the larger effect size noted for seniors in college when compared to freshmen in college may be due to these students being more solid in their choice of an ideal career than the juniors in high school (Robinson et al., 2018).

### **Interview Analysis: Influence of Experiences on Perceptions of Teaching**

After survey data was collected, two to three participants who identify as people of color were chosen from each education-level subgroup for an interview. These participants were chosen using psychobiography intensive purposive sampling to ensure those interviewed presented a unique perspective of experiences as students of color in the Metro Atlanta county (Table 3; Palinkas et al., 2015; Palys 2008; Robinson, 2014). Of the participants, two were males (1 & 2 in Table 3) while all other interview participants were females (3 through 7 in Table 3). Each participant was chosen because their survey responses revealed that s/he could provide unique insight into experiences as a person of color in the Metro Atlanta area. For example, each of the high school junior participants demonstrated above average strength in STEM subjects indicated by either enrolling in upper level math/science classes and/or through SAT/ACT test scores.

However, each demonstrated this strength and interest in a different way; participant 1 is an active member of the health care track offered at the high school, participant 2 has enrolled in upper level science and math courses but found interest in engineering and architecture, and participant 3 is a member of the high school's STEM magnet program that provides rigorous AP and post-AP math and science courses to students. The college participants were chosen to similarly reflect unique experiences.

When choosing who to interview, purposive sampling was also used to identify those who stated that they either *disagreed* or *strongly disagreed* with the statement, "I have considered teaching as a career." This was done in order to provide thick description of perceptions towards teaching of these successful STEM students in this county; the researcher believes that by specifically investigating, in depth, the career perceptions and experiences as a person of color, this study can provide important information towards teacher recruitment reformation that can be used to persuade those who have not considered teaching towards the field. Therefore, Expectancy Value Theory and Critical Race Theory were both used to further investigate patterns through interviews of specific participants in the surveyed population.

### ***Expectancy Value Theory***

Interview questions (f), (g), (h)–(n) (

Appendix 2. Interview Protocol) were open and axially coded using themes within EV theory to further understand perceptions based on professionals' level of knowledge, if they had a demanding job, morale, social status, and salary (

These responses were also selectively coded to identify whether these statements were positive or negative and whether they related to teaching or an ideal career. This coding specifically aimed to provide in depth understanding of participants' perceptions of STEM teaching, their ideal career, and the comparison of the two within the Expectancy Value Theory framework.

**Table 11**; Appendix 3. Codebook for Qualitative Data; Eccles et al., 1983; Saldaña, 2016; Watt & Richardson, 2007). Additionally, open coding revealed that many students also addressed their interest or personalities when discussing career perceptions; because they are included in EV theory of career choice (Eccles et al., 1983), these factors were added to the EV axial codes in addition to the five latent factors that are addressed in the FIT–Choice survey (Watt & Richardson, 2007).

These responses were also selectively coded to identify whether these statements were positive or negative and whether they related to teaching or an ideal career. This coding specifically aimed to provide in depth understanding of participants' perceptions of STEM teaching, their ideal career, and the comparison of the two within the Expectancy Value Theory framework.

**Table 11**

*Axial Codes based on Expectancy Value Theory*

Category	Exemplar
Level of Knowledge (Expert)	<i>Definitely, they know what they're doing... they're obviously skilled more than another person is in that same area</i>
Demanding Job	<i>It's tiring, very tiring. It's time-consuming and stressful. You have to deal with a lot at one time. What else? I feel like the workload is demanding. You have to constantly be up and doing something and making sure that everything's all right for someone else, but you don't have that much time to yourself</i>

Social Status	<i>They've gone to school, so people know that they've put in work to get there and they're well paid, so I'm guessing they have to be somewhat respected to be get paid that much</i>
Morale	<i>Overall, if they love what they're doing, I feel like they'd be happy doing what they do. I feel like if they work long hours, they probably get grueling just like how any person would feel, but I'd say generally, yes, they're happy</i>
Salary	<i>I would say perceptions are I don't think they make enough... yes, they definitely don't get paid enough, in my opinion</i>
Interest	<i>I think that it's a deep love and appreciation for the natural sciences, mathematics, and stuff like that. I love learning about the world, life, and how things work within life, chemicals and stuff like that</i>
Personality	<i>I thought about it and I just don't think it would be for me. I just don't have that much patience with school kids...</i>

**Table 12***Codes based on Critical Race Theory*

<b>Category</b>	<b>Exemplar</b>
Culture	<i>I feel like teachers of color understand how hard it is to get to the position that you are because my parents came from nothing and they have worked really hard to get me here... I feel like there is a difference in culture that makes it harder to connect with some of my whiter professors</i>
Inclusion	<i>She was one of the first teachers I ever had to actually look at me like just as me and not by the color of my skin</i>
Influence of Teachers	<i>For me personally, just feeling prepared and feeling ready to take on what's next has always been important to me... they made me a harder worker. They definitely increased my work ethic</i>
Relationships	<i>[My soccer coach] is one of those people for me that I know that I'm really comfortable talking to. I know I could talk to him about a lot of things, that he's helped me through a lot of issues I've had... I know he's helped me prepare for college and getting scholarships and stuff like that</i>
Relevance of Content	<i>I will never use cosine; I will never use acute angles. These are things I would never use... this isn't going to help me at all. I think that's when I started to hate math... because I would feel like why am I doing this, and it showed.</i>

***Critical Race Theory***

Questions (e), (o), (p), (q), and (r) (

Appendix 2. Interview Protocol) were open and axially coded so that participants' beliefs and understandings as students who identify as people of color could be described (Saldaña, 2016). Then, focused and domain coding (Saldaña, 2016) were used to identify themes within the tenets of Critical Race Theory which allowed for deeper understanding of how experiences as a student who identifies as a person of color in this Metro Atlanta county have influenced these perceptions (

Table 12). During this process, when participants described their experiences as students of color, it was determined that their culture, feelings of inclusion (or lack of), influence of teachers, relationships, and relevance of content were most often the defining characteristics of whether an experience was positive or negative (Appendix 3. Codebook for Qualitative Data). Once interview data was coded within each question subset, the codes were analyzed again through axial and holistic coding in order to determine broader categories and themes within the population (Saldaña, 2016).

### **Perceptions of Teaching**

When exploring participants' perceptions of teaching, they were first asked whether they had ever considered teaching as a career and then to explain why or why not. The majority of those interviewed explained that though they may have considered teaching when they were younger, they were no longer interested in it as a career. Four of the interviewed participants said they didn't "have the patience for kids," and others mentioned that they couldn't see themselves in the career based on their personalities or interests. Additionally, one said that if she "ended up" teaching that should wouldn't mind it, but the responsibility of teaching is something she didn't believe should would do well with, and another said she might consider teaching at the college level but that she's not "outgoing enough" to stand in front of a classroom. When further examining these explanations, the lack of self-efficacy in being a teacher could explain why students have not considered it as a career (Barak, 1981; Bounds, 2017; Brown, 2002; Fisher & Griggs, 1994; Jacobs, 2005; Mau, 2003; Paa & McWhirter, 2000; Sax, 1994; Su, 1997), and the belief that there is a lack of patience or an incorrect personality for the job could also mean that students have not had a chance to thoroughly explore teaching as career (Grotevant, 1987; Kroger et al., 2010; Meeus,



2011). To further understand perceptions of teaching, the codes based within Expectancy Value Theory were further explored.

### ***Demand and Morale***

When describing perceptions of teaching as a career, participants all agreed that teachers have a demanding job, but they also explained that though teaching is stressful, they felt teachers generally had a positive morale and enjoy what they do. For example, one interviewed participant whose mother is a teacher explained:

*Yes, [teaching] is demanding physically, mentally, all the time... it's a very physical job. You're always all over the place, whether its meetings then making lesson plans, making PowerPoints and then everything from discipline. That can be a really long day. It's not just your typical nine to five.*

However, the same participant went on to say, "I think [teachers] are wonderful. I think that their workplace is great... they enjoy what they're doing, but then there's the emotion of having to deal with other aspects of being a teacher." Another participant said:

*I guess just working with kids all the time seems very draining... on top of that, you have a lot of work outside of actual work... you're taking a lot of work home with you, like grading papers, teacher conferences with parents and stuff like that... I know you do get the summers off and everything, so maybe it's a good balance, but I don't know. I think the workload doesn't really balance out with how much you get paid for it.*

This same participant went on to say, "I think generally [teachers] are pretty happy in their careers, but I can see why it would be a stressful job. I think generally they're happy."

Interestingly, these views did not differ that greatly from how participants described their ideal career. For example, one participant whose ideal career is nursing said:

*I feel like stress is a big thing in the medical field in general... because you're dealing with a lot of people. You've got to make sure that this person is all right, this person is able to breathe, and you make sure that this [other] person is all right... you also make sure that you're all right. It's like I'm caring for three people and myself.*

Additionally, this same participant joyfully described how his grandmother who is a nurse would, “come home and be like, ‘I’m just so tired of this job.’ Then she’ll get up an hour later and be like, ‘Guess what happened at work...’ I feel like being a nurse is insane, but they’re in love with the insanity.” The other interviewed participants who plan to enter the medical field also made the same claims that working in health care can be demanding, but they thought overall, those working in the medical field are happy with their jobs. Additionally, the participant whose goal is to become an architect mentioned that there would be demand in meeting the needs of clients but that the payoff with salary and normal working hours meant architects were “generally happy and in a good place.”

Overall, despite the perception that both teaching and an ideal job bring their own set of demands, participants felt that the choice to enter a career field meant you would enjoy the work that you were doing. Essentially, this means that the lack of interest in teaching is likely not related to the perception of the demand of the job as some literature suggests (Florida State Department of Education [FSDOE], 1985; Page & Page, 1984; Summerhill et al., 1998) but rather to the idea of whether these particular participants thought they would enjoy teaching (Paa & McWhirter, 2000; Wigfield & Eccles, 2000).

### ***Experts***

Generally, interviewed participants had mixed views on whether or not teachers should be considered experts. One participant described teacher expertise based on how well a teacher is at

delivering content; he said, “I just feel like if you’re really committed to teaching and advancing the youth then I would call you an expert, but if you’re just going to the board and just writing something out saying, ‘All right copy that down,’ [you’re not an expert].” Another participant felt expertise is based on what the teacher was responsible for teaching because she felt that an AP Chemistry teacher is more of an expert than a general math or on level teacher, and one felt that a teacher’s degree (i.e. Masters of Chemistry versus Masters of Chemistry Education) determined how much of an expert a teacher should be considered. Further, another participant mentioned that the responsibility and “high standards to do well” ensured that teachers are experts in their field.

However, the other participants mentioned that teachers’ expertise is tied to the amount of school and training that they receive. One participant said, “They go through a lot of schooling, they spend hours in a classroom, they spend hours learning how to make lesson plans, how to deal with children who are difficult. They definitely know their field.” While others said, “I know they know that they’re doing... they go through all that school,” and “they go through lots of education to get to this point.” Interestingly, equating time spent in school to level of expertise was also a common theme found when participants described the expertise of those in their ideal career. For example, participants mentioned the years of education or training that is needed to enter their ideal career field. Some specifically mentioned eight or fourteen years of school for medical specialization while others mentioned that the on-site training for nurses or doctors as part of their education that leads to expertise.

Overall, participants seemed to consider those in their ideal careers to all be considered experts in their field, but they did not feel that all teachers should be given the same consideration. This could be in part due to their individual experiences with teachers as well as those in their ideal careers; each of the interviewed participants mentioned that they knew one specific person,

personally, who had a career in their ideal field. However, all participants had experiences with more than 30 individual teachers. Literature suggests that interactions influence career choice and development (Bobo, 1998; Dick & Rallis, 1991; Farmer, 1987; Fielstra, 1955; Fisher & Griggs, 1994; Griggs, 1992; Jones & Larke, 2003; Manuel & Hughes, 200), so these participants' experiences as students have likely influenced their perceptions of teaching as a career (Bowleg, 2012; Gillborn, 2015; Parker et al., 1999; Sleeter, 2016).

### *Social Status and Salary*

When asked to describe the social status of teachers, the participants, overall, felt that teachers should be more respected than they are. One participant said she felt like teachers were somewhat respected but that they did not receive the same social status other STEM field professions. Another said, "Teachers normally aren't put in that light of a hero, they're just teachers. But I think that they should definitely be put in a more positive light," and one other said, "I think they are respected, but I feel we really should respect them more because they're the foundation of education really, the foundation of careers, life, learning and stuff like that. I think they definitely need to be more respected than they are now."

Interestingly, many of the interviewed participants associated social status with salary. For example, when one student was asked to explain why teachers are respected less than doctors, she said, "I feel like it's the salary and the paycheck." Moreover, when asked to describe the social status of a teacher, others mentioned that, "They definitely don't get paid as much as they should be because teachers are really respected. At least, I really respect them" and "I have heard that teachers don't get much salary, definitely not as much as the other higher status jobs." Additionally, one other participant blatantly said, "in other [countries], teachers are held at such a high social standard, but here, it's weird. I feel like it has to do with money, and maybe people just

don't see how hard they really work behind closed doors." When specifically asked about the salary of teachers, all the participants thought teachers' salaries are "lower than they should be," and when asked, more than half of those interviewed mentioned salary as a negative aspect of the teaching profession. Essentially, participants felt that teachers should be paid more than they are because of the work they put in, the stress and responsibility of the job, and because of the importance of the teaching profession; one went so far as to say one that teachers should be "millionaires" because without teachers, "we wouldn't be where we are; that's just that."

Taking these statements into consideration, it is obvious that the potential costs of teaching do not outweigh the attainment value for these students (Eccles et al., 1983; Eccles, 2011). Thankfully, though, one participant mentioned that the recent events could help improve teachers' social status and salary:

*I think now people are starting to realizing, having all these kids at [home] for homeschooling, it's really difficult to keep a kid on track, to have them pay attention for an extended period of time, to be able to teach them, keep them attentive and all of that stuff. It's hard, and they deserve the respect for that.*

### ***Within and Between Education Subgroups***

Based on the survey's findings that there was a statistical difference in perceptions of teaching between freshmen in college and the other two education subgroups in this study, interview responses were analyzed to better understand this. Specifically, the survey data indicated that the biggest differences in perceptions existed in the latent factors of salary, social status, and expertise (

**Table 9).** When further investigating the axial codes for each of these factors from the interviews, few differences could be noted because the participants all spoke about similar perceptions of teachers having low salaries, not being respected enough, and *generally* being experts given certain criteria.

However, when examining perceptions of teaching overall, the interview responses revealed that the participants who are freshmen in college were possibly more open to the idea of becoming a teacher. For example, when asked to describe her perceptions of positive aspects of teaching, participant 4 stated

*Like what I was saying about how teachers don't get paid to show compassion to do things outside of just teaching, I think that'd be really cool to do because I do like interacting with kids. I do like teaching kids sometimes. I volunteer and things like that, and I like [think], 'This would be really cool to do' ... that'd be really cool just to feel that gratitude."*

The other college freshman who was interviewed stated, "I've had teachers and professors who are really impactful and that got me thinking about maybe I should try teaching." This same participant went on to describe teaching as "beautiful" when teachers get to watch their students grow and learn. However, both participants also eluded back to working with children and dealing with "other aspects of teaching" as big turn offs to the teaching profession.

Comparatively, despite finding similar positive aspects in helping students and watching them grow, the high school juniors and college seniors who were interviewed did not seem to have ever considered teaching nor did they seem like they would be open to the idea. One similar finding in this was that both juniors in high school and seniors in college mentioned personality factors as reasons to not consider teaching, but the focus of their negative perceptions of teaching were based in different areas. For example, the high school juniors focused on behavior issues in classrooms.

One junior said, “I’ve had teachers who have literally had to deal with students and I’d be like, ‘These kids are crazy’,” and another said, “I just haven’t had the best experience with teachers as far as behavior-wise maybe.” On the other hand, the seniors in college eluded more to job specific aspects such as salary, work–life balance, and parent teacher relationships as negative aspects of teaching.

Interestingly, the researcher noted that each of the participants who were juniors in high school or seniors in college answered with a firm “no” when asked if they’d considered teaching as to where the freshmen in college were a little more hesitant before saying “no” in the actual interviews. This may indicate that because freshmen in college are not so far removed from K–12 classroom environment and are more likely to be in the moratorium status of occupational identity development (Kroger et al., 2010), they may be more willing to consider teaching as a career as survey results indicated that they have statistically more positive perceptions of teaching as a career (

Table 10).

### ***Nonconformity***

Despite not considering teaching, the interviewed participants were also asked what changes could be made to the profession that could make them consider it. While the majority of the participants were not very specific in their answers because they felt their personalities would not fit the career, two participants specifically mentioned the ability to be creative and innovate as aspects that could make them consider teaching. This is supported in other literature that suggests curricular autonomy is among the factors considered when people think about choosing teaching as a profession (Guarino et al., 2006; Gunter, 2019)

Further, though the participants in this study mentioned innovation in the way of technology or teaching styles, other similar studies suggest that people of color feel as if you have to “sell out” on your culture in order to conform to the curriculum that is taught in schools (Bergerson, 2003; DeCuir & Dixson, 2004; Graham & Erwin, 2011; Ladson–Billings, 1998). Essentially, the idea that teachers must conform to similar teaching methods and styles is consistent with other literature that suggests people of color do not become teachers because they do not want to conform with the hegemonic ways of America’s education system (Graham & Erwin, 2011; Ladson–Billings, 1998).

### ***Positive Aspect of Helping Others***

Despite having different ideal careers in mind, when participants were asked to describe positive aspects of their ideal career, each mentioned being able to help people in one way or another which is consistent with literature in that people of color are often internally motivated by a willingness to help others (Brown, 2002; King, 1993a; Su, 1997). However, despite not considering teaching as a career, six of seven interviewed participants also mentioned that helping



students succeed is a positive aspect of teaching. For example, six of the seven interviewed participants eluded to helping students succeed as being a key positive aspect of teaching with one participant specifically stating, “I think you get to make a lasting impact on whoever you’re teaching.” This commonality could be a key point of emphasis for teacher recruitment programs targeted at increasing the number of teachers of color in STEM classrooms.

### **People who Look like Me**

During the interviews, the majority of participants explained that their experiences as a person of color have directly influenced their perceptions and choices of a career as is suggested in literature (Bounds, 2017; Bowleg, 2012; Eccles, 2009; Gillborn, 2015; Kyansny et al., 2009; Lent & Brown, 1996; Parker et al., 1999; Sleeter, 2016). Interestingly, however, the participants felt differently about whether being a minority race in a career field was viewed as an area of opportunity or whether seeing others like you in a career made that field more inviting.

One of the Hispanic participants who was interviewed explained that after taking architecture classes in high school and speaking with his friends and family that he wants to pursue a career in owning his own architecture firm. The participant explained:

*Like I said, the friend that I work with, already being in that area of building houses, construction, and stuff like that, it’s always been an interest. I don’t want to just be like the... not in a bad way but the regular stereotype of Mexicans being a construction worker but actually doing more than just that, being higher up in the rankings.*

When asked to clarify if identifying as Hispanic has influenced his career path, he said, “[In] some ways, yes.” This is consistent with literature in that people are likely to gravitate towards careers in which they see people like themselves (Noguera, 2003; Stinson, 2006), but the opportunity to explore architecture gave this student the confidence needed to pursue the “higher up rankings” of

owning his own firm (Gushue et al., 2006). Additionally, each of the other interviewed participants mentioned someone in their family who works in their ideal career field indicating that exposure and exploration along with being able to identify with and see themselves in the career are important aspects of career choice (Bounds, 2017; Eccles, 2011; Lent & Brown, 1996; Wang & Degol, 2013).

On the other hand, two of the participants specifically mentioned the lack of people of color in their ideal careers as being areas of motivation for continuing to pursue that profession. One explained that being in a health-care class with other people of color increased his self-confidence and ability in the coursework. Additionally, he explained that his teacher's explanation of a lack of people of color in nursing further pushed him to pursue the career:

*Honestly, she... How do I say it? She was really big on people of color being in the medical field. She was like, "It will be amazing. This needs to happen." When she [said] that, it was like, "Okay, this is helping me as a person" and my grades became better.*

Another participant said, "There aren't really a lot of people that look like me in that field, so I wanted to just add some diversity to it" when asked why she felt like the medical field is the career path for her. With these responses, it is obvious that not only did these students feel comfortable pursuing these careers because they are related to someone with a similar profession, but they also have a motivation to become role models while also helping others as part of their daily lives. Interestingly, these are very similar reasons as to why people of color choose to teach (Brown, 2002; King, 1993a).

### **Experiences of People of Color in Educational Institutions**

Literature suggests that interactions influence career choice and development (Bobo, 1998; Dick & Rallis, 1991; Farmer, 1987; Fielstra, 1955; Fisher & Griggs, 1994; Griggs, 1992; Jones &

Larke, 2003; Manuel & Hughes, 2000), so these participants' experiences as students have likely influenced their perceptions of teaching. Therefore, this study utilized Critical Race Theory (CRT) to better understand how participants' culture has influenced perceptions of teaching in hopes of understanding how to better recruit people of color into K–12 STEM classrooms as teachers.

### ***Relationships***

Literature indicates that teachers influence students' perceptions of classroom content, but students and teachers are also constantly influenced by their environments leading to a complex set of interworking, everchanging factors that impact student learning and education experiences (Cohen & Ball, 1999; Stinson, 2006; Weisglass, 2002). Therefore, it was not surprising when participants highlighted the impact of relationships that the participants had, or did not have, with their teachers when asked to describe their education experiences as students of color in this bounded case.

**I Hate Math.** During the interviews, participant one (a high school junior who wants to be a nurse) said, “Successful? Moderately, it depends. I can only say I probably did bad in one class, which was physics, but it was just like, it’s a lot of math and I hate math” when asked if he considered himself successful in STEM subjects. Initially, he claimed it was because he felt that math and physics were difficult to study, but as the interview continued, it became clearer that there were other underlying reasons for his dislike of math. Specifically, when asked to describe a negatively influential teacher, the student described his 8<sup>th</sup> grade math teacher who would “just throw up questions on the board and be like, ‘All right. Solve them.’ It was like, you didn’t teach us how to solve it so what am I about to do?” Later, when asked how teachers have impacted his success in STEM subjects, he said, “It just depends on the class, the teacher” and further said, “A

lot of things just come to me naturally. For me, science and math, I hate math, but I'm really good at it. I do not like math at all."

So, the researcher then asked if he could explain why he feels so negatively about the subject. The student admitted that the content began to seem irrelevant when "you guys started putting letters and stuff in math. I was like, what is this? Because I want to be in a medical field, I was like, a lot of this stuff I will never use." Then, the researcher asked if his dislike of math had any relationship with his dislike of his 8<sup>th</sup> grade math teacher. He responded with, "Definitely" and went on to describe that when the content was difficult and he would ask for further explanation, the teacher would tell him to just "look at the board" instead of providing one-on-one guidance. The participant further said, "I feel a lot of times with math teachers, they're, I wouldn't say arrogant, but it's like they have a mentality of 'I know this,' so they'll breeze through a problem [even though] I need them to go slowly." Essentially, the lack of relationship with his 8<sup>th</sup> grade math teacher led this student to not only dislike that particular teacher but to also "hate" math and to struggle in its application.

**I'm a Chemistry Major.** Another instance of the impact of relationships with teachers became evident in the interview with participant 4 (a freshman in college who is majoring in chemistry). This student plans to be a dentist and said that her aunt, who is an oral surgeon, recommended majoring in biology or chemistry because of the Dental Admission Test. When asked to describe if she considered herself successful in STEM subjects, the participant said, "Yes" because she has a "really deep love and appreciation for the natural sciences, mathematics and stuff like that. I love learning about the world, life and how things work within life, chemicals and stuff like that."

When asked to describe a positively influential teacher, this student described her high school chemistry teacher. Specifically, she said, “He didn’t necessarily do the best job at teaching chemistry, but he was just one of those people that you keep in touch with years after you graduate. He’s always giving really good advice, just a really positive guy, I think.” Later, the researcher asked if her positive experience with her high school chemistry teacher influenced her choice to major in chemistry. The participant said, “I definitely think so, 100%... I definitely think a lot of my [success in] STEM-related subjects [was because] the teachers in those subjects, they’ve always been really good, so it definitely pushed me to choose chemistry.”

Overall, it became obvious that the interviewed participants strongly valued the relationships that teachers built with them when considering positively influential teachers. Each of the students looked for someone to get to know them as an individual, and these relationships led to positive experiences in the courses; for example, one participant said, “She was one of the first teachers I ever had to actually look at me like just as me and not by the color of my skin” indicating that inclusion and recognition are key parts of getting to know students and to build relationships. Alternatively, each of the students who admitted to having negatively influential teachers mentioned that a lot of these “negative” experiences were based on a lack of relationship, and this lack of relationship led to a general dislike of that course content; for example, one student said, “I’ve always felt like a lot of teachers didn’t really get to know me at all. They didn’t try. Some of them I feel like they didn’t care, honestly.” These findings indicate that relationships with teachers influence a student’s perceptions of the course content in general and further support the need for increased diversity in STEM classrooms. Teachers of color have a strong positive influence on the education, proficiency, and motivation of students (Blum, 2005; Brown, 2014; Cole, 1986; Graham 1987; King, 1993b; McNeely & Falci, 2004; Resnick et al., 1997 as cited in

Atkins et al., 2014), and this may be based on the relationships that they build with their students—specifically those with students of color.

### *Schools as Oppressive Institutions*

Emerging from 1970's Critical Legal Scholarship movement, CRT aims to “expose racism where it is most intractable: at the core of our everyday assumptions and practices” (Litowitz, 1996, p. 511). At the center of CRT is the tenet that racism is endemic, institutional, and systematic (Bell, 1987; Solórzano & Delgado Bernal, 2001), and the internal racism of the education system is one that other studies have cited as dissuading students of color away from the teaching profession (FSDOE, 1985; Graham & Erwin, 2011; Page & Page, 1984; Summerhill et al., 1998). Similarly, interviewed participants in this study also described experiences that highlight the need to understand how race is important in education and society (Ladson-Billings, 1998). Interestingly, however, participants described instances both in which teachers instigated racism as well as instances in which teachers recognized and addressed it.

**Experiences of Racism.** Of the seven participants who were interviewed, four of them described specific experiences in which they experienced racism while in school. When describing experiences of how they have been treated as students who identify as people of color, one student who grew up in a school where he was often the only African American student in his classes explained that he felt out of place in school because he was “treated like he was the only [person of color] in the class.” He explained that his teachers and classmates would make him feel uncomfortable and that he often got in trouble because of “teachers clearly making up complete lies.” He further explained a specific instance in which a student was “messing with him” and eventually started using the “N-word.” Unfortunately, the student further explained that he “never told [an adult]” because he felt like when “it comes to racial things... you don’t say anything.”

Another student described how a teacher “would just witness a lot of racially influential things happen and not say anything.” In this instance, the participant explained that a student in class was openly making racial remarks, but when she went to the teacher about it, she felt like the teacher was “dismissing” the racial slurs that were disrupting her learning as well as her wellbeing. Further, one participant mentioned that he’s felt as if his teachers questioned his intelligence because:

*[Hispanics] are not always as smart I guess, at least that’s how people see them. In a lot of my classes, I’m one of the only Hispanics in that class, especially guy Hispanics... I’ve at least seen differences [in how I’m treated] because it’s mainly white people in the classroom.*

Another student who specifically identifies as Persian (Asian for the broader scope of this study) described an alarming experience in which she asked her 7<sup>th</sup> grade teacher for a pass to the office. The participant explained:

*I’m not even kidding, she said, ‘Oh no, you’re fine, they’re not going to think you’re a terrorist or anything, but that’s what I thought when I first met you.’ My jaw dropped, I left the class that day and just didn’t come back because I was so distraught from that.*

Each of these experiences emphasizes how methods of counter storytelling allow researchers to understand how race operates in society and education (Brown, 2014) and to expose racism at an institutional level (Ong et al., 2018). Interestingly, one of the students who could not describe a specific instance of racism identifies as Hispanic, but she said she “doesn’t look Hispanic” as if this is the reason to have not been treated differently. However, this statement further emphasizes the inherent Whiteness of education in that the way a student looks could be calls for him/her to be treated differently (Parker, 1998; Ware, 1998).

**Recognition of Culture.** When asked to describe a positively influential teacher, one of the interviewed participants described her AP Literature teacher as being “one of the first teachers I ever had to actually look at me like just as me and not by the color of my skin.” She described that she grew up as an African American in a predominantly white area “where people weren’t always the nicest.” She described a particular incident where another student was harassing her because of her skin tone. The participant said she told the teacher, and the teacher helped with the administrative process of it that the student wasn’t aware she had access to. She went on to say that this same teacher took time to celebrate Black History Month and “explained why we should always just be kind to one another because I don’t experience that every day. She talked about racial profiling and stereotypes. She just hit a lot of nails on the head.”

Another participant described his fourth-grade teacher who taught Black History, and he admitted that that was one of the first times he’d ever celebrated it. He said she “influenced him as a person” because he didn’t know a lot about his history as an African American, and the lessons she taught “inspired him” to be someone to remember. Additionally, he described that a teacher who emphasized the need for people of color in the medical field really pushed him to believe in himself and pursue his interests. These stories highlight the importance of understanding and emphasizing group and ethnic identities for people of color in multicultural societies (Fouad & Byars-Winston, 2005; Phinney, 2000).

### ***Teachers of Color v White Teachers***

Literature within the CRT framework implies that race is a significant determinant in inequities that are found within educational institutions (Ladson-Billings & Tate, 2016; Stinson, 2004). Therefore, participants in this study were asked to describe their unique experiences with teachers of color as well as with white teachers in order to provide thick description of these



students' experiences of hegemony within the bounded case. Though some of the interviewed participants explained that they had never really noticed a difference between their teachers of color and their white teachers, others highlighted common differences in their experiences.

When describing teachers of color, each of the interviewed participants highlighted the strong relationships that they built. For example, one participant described how his teachers of color "included everyone in everything" and "never wanted anyone to feel like they didn't belong." Another participant said that her teachers of color always pushed her to be better and taught her how to focus, and another explained:

*Teachers of color understand how hard it is to get to the position that you are [in] because my parents came from nothing and they have worked really hard to get me here and they didn't have opportunities. I feel like with white teachers they're just like, 'Oh, it's another student.' I feel like there is a difference in culture that makes it harder to connect with some of my whiter professors.*

One the other hand, students had mixed experiences with their white teachers. When describing negative experiences with white teachers, the participants commonly described teacher apathy and/or a lack of relationship. For example, one participant described two different white teachers who "didn't teach" while another participant said that when asking a teacher for help, the teacher simply asked, "Why don't you understand this?" and wouldn't provide much guidance. Another explained that, "[my] white teachers just kept me on the same slate as others and some would be shocked when I did well." She went on to further explain that she felt she has to work harder to prove herself in a white teacher's class. Alternatively, participants also described some of their white teachers as being incredibly influential. One explained that a white teacher emphasized the lack of people of color in the medical field as motivation for him to continue on

the path, and another described how a white teacher helped celebrate Black History month in a way that was surprisingly meaningful for the student.

Overall, the students who recalled differences in their teachers of color and their white teachers mainly described positive experiences with their teachers of color versus mixed ones with their white teachers. Responses generally revealed that these participants felt they could make better connections with their teachers of color which is supported with previous literature (Achinstein et al., 2010; Dilworth & Brown, 2008; Duncan, 2010; Sleeter, 2016; Villegas & Davis, 2008). However, one underlying theme of positive experiences, regardless of the teacher's race, was yet again that those teachers sought to know the students individually by building relationships.

### Synopsis of Secondary Research Questions

The purpose of this chapter is to present the findings of the data collected in this case study to help answer the research question: How do the experiences of successful STEM students who identify as people of color influence their perceptions of a career as a STEM teacher? In order to do this, a secondary research question approach was taken in which mixed methods were used to holistically understand students' perceptions of teaching, of their ideal career, and how their experiences as students of color in this bounded case have influenced these perceptions.

**Table 13**

*Integrated Results Matrix for Comparison of Perceptions*

Question	Quantitative Result	Qualitative Result	Example Quote
Is there a statistical difference between perceptions of teaching and perceptions of an ideal career for students who identify as people of color?	Yes, there is a statistical difference between perceptions of teaching and perceptions of an ideal career for students who identify as people of color	Ideal career factors of demand, expertise, morale, social status, and salary were described in an overall more positive light than those same factors for teaching.	"I feel like [teachers] are respected, but, unfortunately, not as much as like a more STEM profession such as a doctor or biologist ... I think it's because of the

	$(p < 0.005)$		salary and the paycheck..."
Is there a statistical difference of perceptions of teaching between students who identify as people of color when compared to the perceptions of students who identify as white when considering current level of schooling?	There is not a statistical difference between students who identify as people of color when compared to students who identify as white $(p > 0.05)$	The participants who are freshmen in college were possibly more open to the idea of becoming a teacher	"I've had teachers and professors who are really impactful and that got me thinking about maybe I should try teaching."
	There is a statistical difference when considering current level of schooling $(p < 0.005)$		

The first two secondary research questions were answered using quantitative data and further supported via triangulation with qualitative data (

Table 13). The survey data revealed that there is a statistical difference between perceptions of teaching and perceptions of an ideal career for students who identify as people of color ( $p < 0.005$ ) with the average composite score for ideal career ( $M = 63.88$ ) being 14 points higher than that for teaching ( $M = 49.72$ ; Table 5). Descriptive statistics revealed that while the average score for perceptions of an ideal career were higher for all five latent factors addressed by the survey (expert, demand, morale, social status, and salary), the largest differences were in the latent factors of salary and social status. This finding was further supported in the qualitative results as participants often mentioned salary as an indicator of low social status for teachers. Specifically, one student explained that though teachers are respected somewhat, they do not receive as much respect as "other STEM professions," and she thought that this was directly related to the salary that teachers receive. These findings are consistent with literature that says generally, people

believe teachers are not paid nor respected enough (Curtis, 2012; Shipp, 1999; Watt & Richardson, 2007).

Survey data was also used to help understand if there is a statistical difference in perceptions of teaching between students who identify as people of color when compared to the perceptions of students who identify as white when considering current level of schooling. Results of the two-way ANOVA (

Table **10**) revealed that while there was no main effect of race/ethnicity ( $p > 0.05$ ) nor was there an interaction between education subgroup and race/ethnicity ( $p > 0.50$ ), there was a significant difference in perceptions of teaching when considering education subgroup. Specifically, freshmen in college reported a significantly ( $p < 0.005$ ) more positive perception of teaching ( $M = 52.55$ ,  $SD = 6.874$ ) than those who were seniors in college ( $M = 47.10$ ,  $SD = 9.248$ ) or juniors in high school ( $M = 47.49$ ,  $SD = 9.480$ ). Despite the descriptive statistics revealing that the largest differences in perceptions existed in the latent factors of salary and social status, (

**Table 9)**, the qualitative results did not reveal much difference in interview responses. However, the interview responses *did* reveal that the participants who were freshmen in college seemed more open to the idea of becoming a teacher which could have resulted in the significantly more positive perceptions. For example, these participants described that it would “be really cool just to feel that gratitude” and that people in their lives have asked them to consider the profession. Comparatively, the high school juniors and college seniors who were interviewed seemed less likely to consider teaching citing personality and behavior problems in classrooms as specific reasons.

The third secondary research question, “How have the unique experiences of students in this county who have shown strength in science and math and who identify as people of color influenced their perceptions of teaching?” was answered through axial and holistic coding (Saldaña, 2016). When asked if their experiences in school have influenced their perceptions of teaching as a career, all interview participants said yes, but their explanations of this were slightly different. Four mentioned the amount of work that teachers put in. For example, one participant said:

*I guess I can see how much work these teachers have had to put in to teaching us and getting us ready for life. It's definitely given me a lot of respect for them. Also, it has shown me that I probably would have a really hard time doing it myself.*

Another participant mentioned not wanting to be a teacher that students didn't like, one mentioned his experience with teachers who didn't seem to like their job, and another explained that her experience with teachers' lack of making content seem relevant and inability to be creative makes her feel strongly against the career. Each of these summarized responses were also revealed with participant responses to other questions throughout the interview. Essentially, the participants

thought not only that their personalities were not a good fit for teaching, but they also felt that the demands of teaching do not correlate to the generally low social status that is further emphasized by low salaries. However, students did see value in being able to help others and felt that being able to watch students succeed is rewarding.

Coding also revealed that participants' relationships with past teachers may be the most influential aspect that has impacted their perceptions of teaching; further, relationships with teachers have also influenced their choice of an ideal career. Many of the participants revealed that when teachers worked to build relationships with them, they were more likely to enjoy that teacher's class. One student even admitted that she had such a good relationship with her chemistry teacher that she chose to major in chemistry in college. Other participants also explained that when their teachers pushed them to do better, they gained confidence in their abilities to succeed in STEM courses, and their interests in the subjects increased. On the other hand, it was also revealed that when these students did not have strong relationships with their teachers that they developed an overall dislike for the subject. Therefore, the relationships that students have had with their teachers influenced their perceptions and choices of careers in both positive and negative ways. This implicates that teacher recruitment programs should consider leveraging current teachers' relationships with students.

### **Chapter 5: Conclusions, Implications, and Future Work**

Literature explains what factors influence career choice (Dunteman et al., 1978), a need for diversity in STEM fields and classrooms (Allen–Ramdial & Campbell, 2014), and why people choose teaching (Richardson & Watt, 2006). However, there is general sparsity in the literature in terms of the driving factors in multicultural vocational choices (Graham & Erwin 2011; Lent, 2005), and though some research has addressed the imbalance of people of color in some careers, few studies have addressed the issue in teaching (Graham & Erwin 2011; Smith et al., 2004). Therefore, this study utilized a case study research tradition designed within the Expectancy Value and Critical Race Theory frameworks to investigate factors that influence students who identify as people of color’s perceptions of becoming STEM teachers.

The goal of this research study was to answer the research question: How do the experiences of successful STEM students who identify as people of color influence their perceptions of a career as a STEM teacher? Specifically, this study looked at a bounded case in one county in the Metro Atlanta area in order to address the following secondary research questions: (1) Is there a statistical difference between perceptions of teaching and perceptions of an ideal career for students who identify as people of color? (2) Is there a statistical difference of perceptions of teaching between students who identify as people of color when compared to the perceptions of students who identify as white when considering current level of schooling? And (3) How have the unique experiences of students in this county who have shown strength in science and math and who identify as people of color influenced their perceptions of teaching? This chapter presents the overall conclusions for the findings presented in Chapter 4 in the context of the theoretical frameworks discussed in Chapter 2, and implications of this research are presented for



teacher recruitment. The chapter concludes with future work based on the results from this dissertation.

## **Conclusions**

This study is among the first of its kind to compare perceptions of STEM teachers to those of an ideal career for students of color who have identified interest in STEM careers. The survey instrument was used to elicit a holistic comparison of perceptions of an ideal career to perceptions of STEM teachers, and it was developed within the Expectancy Value theory framework which is useful in understanding perceptions of teaching as a career (Berger & D'Ascoli, 2012; Dunder, 2014; Fokkens-Bruinsma & Canrinus, 2012; Hennessy & Lynch, 2017; Watt et al., 2012; Watt & Richardson, 2007). Statistical analysis of the survey results revealed that students within the surveyed population have statistically lower perceptions of teaching than they do for their ideal career ( $p < 0.005$ ), but of those surveyed, the freshmen in college had statistically higher perceptions of teaching than those who were juniors in high school or seniors in college ( $p < 0.005$ ) which could be explained if the data was further explored on the basis of identity status development. There was no statistical difference identified when comparing perceptions between students who identify as people of color to students who identify as white ( $p > 0.05$ ).

When further examining the descriptive statistics of the survey, it was found that the largest differences in perceptions were found within the latent factors of salary and social status. This is consistent with literature that says generally, people believe teachers are not paid nor respected enough (Curtis, 2012; Shipp, 1999; Watt & Richardson, 2007), and interview responses revealed that students often associated social status with salary. Interview responses coded within both the Expectancy Value and Critical Race Theory frameworks also revealed more specific information

about how the experiences of successful STEM students who identify as people of color have influenced their perceptions of a career as a STEM teacher.

### ***Building Relationships***

When analyzing data to answer the question, “How have the unique experiences of students in this county who have shown strength in science and math and who identify as people of color influenced their perceptions of teaching?”, it became apparent that the participants strongly valued their relationships with their teachers in their education experiences. Each participant explained that their most positively influential teachers were those who took the time to get to know them as individuals and those who pushed them by setting clear, high expectations. Though the participants in this study noted that both teachers of color and white teachers were among their most positively influential teachers, literature suggests that teachers of color are more likely to naturally have higher expectations for students of color (Dee, 2005; Ferguson, 2003; Gershenson et al., 2005; Jussim et al., 1996; Oates, 2003) while also increasing the confidence and motivation of students of color (Cole, 1986; Graham 1987; King, 1993b).

Moreover, participants explained their negatively influential teachers were those who made little to no effort to form relationships or those who blatantly ignored the reality of ethnocentrism and oppression in schools. This lack of relationship and refusal to challenge institutional racism of education are reasons that are also cited in extant literature that has explored why people of color do not choose to teach (Graham & Erwin, 2011). However, Critical Race Theory suggests that people of color have specific knowledge that is important for transforming educational research and practice (Bergerson, 2003; Brown, 2014; Cole, 1986; DeCuir & Dixon, 2004; Graham 1987; King, 1993b; Sleeter, 2016; Stinson, 2006). So, the counter–stories of the students who identify as people of color in this study suggest that not only do more teachers of color need to be recruited

for achievement purposes, but the specific experiential knowledge of teachers of color should also be used to reform teacher preparation programs towards acknowledging racism and overcoming oppositional tensions between personal and systemic ties (Brown, 2014; Gist, 2017; Gist et al., 2019; Jackson & Kohli, 2016; Sleeter, 2016; Sleeter & Thao, 2007; Tellez, 1999). If all teachers can more successfully navigate conversations about race in an effort to decrease marginalization, people of color may be more willing to consider teaching as a career.

### ***Institutional Racism***

During the interviews, the majority of participants explained that their experiences as a person of color have directly influenced their perceptions and choices of a career as is suggested in literature (Bounds, 2017; Bowleg, 2012; Eccles, 2009; Gillborn, 2015; Kyansny et al., 2009; Lent & Brown, 1996; Parker et al., 1999; Sleeter, 2016). Specifically, students explained that their experiences dealing with institutional racism have influenced their overall schooling experiences and likely their perceptions of teaching as a career which is supported in literature (FSDOE, 1985; Graham & Erwin, 2011; Page & Page, 1984; Summerhill et al., 1998). Many of the interviewed participants revealed experiences with teachers ignoring or instigating oppression and racism which further supports that many students of color have negative interactions at school (Barrant et al., 2002), and these likely led to negative perceptions of teachers and teaching (Graham & Erwin, 2011). However, the students also indicated that teachers who were not afraid to talk about race, culture, and ethnicity were their most positively influential teachers. This implies that as the demographics of classrooms continue to change, it is incredibly important for teacher recruitment programs to recruit diverse candidates because literature indicates that teachers of color can help alter teacher education programs to better address how to deal with differences in cultures and to

challenge the ethnocentrism of oppressive schools (Bergerson, 2003; Brown, 2014; DeCuir & Dixon, 2004; Sleeter, 2016).

### **Limitations**

There are limitations to this study that emerged from methodological decisions made during the study. First, though the high school juniors interviewed in this study were not being graded by the researcher, two had previous relationships with the researcher which may have skewed the responses in their interviews. The second limitation is that the use of a composite score for perceptions of teaching and of an ideal career may have limited the variability in understanding these perceptions on the specific latent factors addressed by the survey. Consequently, this could possibly make the data less generalizable. Finally, the comparison between the high school aged students and those in college may be considered somewhat weak because even though the schools are in the same area, this does not mean that all of the college students in the study went to a high school within the same district as the chosen schools for the study.

### **Implications for Teacher Recruitment**

Findings from this study indicate that recruitment efforts for teaching should occur during the freshman year of college as these students had significantly more positive perceptions of teaching as a career and may be more likely to consider it as they continue to explore their occupational identities and choices. Specifically, recruitment efforts should start by someone proposing teaching as a career option (Page & Page, 1984), and the findings of this study indicate that it is important for current teachers to be part of the recruitment process due to the emphasis that students placed on their relationships with their teachers.

Additionally, this study's participants often mentioned that their personalities did not fit with teaching or that they did not want the responsibility that comes with the profession, but they

still planned to pursue careers that require them work with people and hold a lot of responsibility. So, career counseling efforts that focus on recognizing characteristics of identities should be considered for targeting recruits for the teaching profession because literature suggests that those who like to “inform, train, develop, cure, or enlighten” (Holland, 1997, p. 4) are likely to flourish in a social workplace environment such as teaching (Swanson, 2011). Further, this study suggests that an increase in salary could lead more students of color to consider teaching as other literature suggests (Allen, 2005; Gilmore, 2018; Guarino et al., 2006; Gunther, 2019; Hines, 2007; Scott, 2019; Torres et al., 2004), but because this may be difficult, this study and others also suggest that a comprehensive and strategic recruitment plan that includes philosophical connections to the work of a teacher may be effective (Fletcher & Luft, 2011). Moreover, the findings of this study have specific implications for various education stakeholders.

### ***Human Resources***

The results of this study indicate that people of color may be more willing to teach if the salary, social status, and morale of current teachers was improved. Though human resource (HR) departments may have little control over salaries, they could help to improve the social status and morale of teachers by taking both an internal and external approach to help improve recruitment efforts. For example, HR departments could work to externally share specific stories of teachers going above and beyond in order to improve the social status of teachers. This could include marketing teachers who are pursuing higher education or professional development opportunities, by highlighting teacher leaders within the community, or by celebrating the successes of teachers with the students of the school. Even though perceptions of social status are tied to salary, if the general public views teachers on an even playing field with other professions rather than simply

based on memories of their teachers, then the overall level of professional respect may increase for certain communities.

Internally, HR departments can work with local school leaders to increase the morale of teachers. This can be done by removing some tasks from the day to day lives of classroom teachers. For example, there have been more times than I can count that I have been asked to give up my planning period or have been mandated to stay after school for supervision of activities. Though I accept these as part of the job, eliminating the extra work required by teachers and stretching them less could lead to overall improved morale in schools. Additionally, districts can provide mental health wellness workshops to provide teachers with tools to help them stay mentally well throughout the school year.

### ***Faculty for Pre-Service Teaching Programs***

Literature indicates that the opportunity to explore a career is important in the development of one's occupational identity status (Grotevant, 1987; Kroger et al., 2010; Meeus, 2011), and this study indicates that current teachers should become part of the teacher recruitment process due to their ability to leverage the relationships that they've build with their students. When considering the implications for current teachers, this means that teachers should be more intentional about suggesting teaching as a career to high school students, but that faculty in pre-service teaching programs should provide specific opportunities for students who have not majored in an education major to explore the career. For example, freshmen in college who identify as people of color may be more likely to choose the profession if given the opportunity to participate in low stakes teaching opportunities as other studies have found that the opportunity to work with students and to give back positively influence the choice of whether to consider teaching as a career (Deason et al., 2020; Tomanek & Cummings, 2000). Additionally, this type of opportunity may also provide

a chance to increase students' self-efficacy towards the career (Christensen et al., 2019) which could further motivate them to pursue the teaching.

Overall, this study further supports the need to increase the representation of teachers who identify as people of color in K–12 STEM classrooms (Achinstein et al., 2010; Guyton et al., 1996; King, 1993a; Quiocho & Rios, 2000; Sleeter & Milner, 2011). With this current study's focus on understanding experiences of students who identify as people of color, counter storytelling revealed that despite the population's unique demographics, the students still described instances in which they witnessed the whiteness of the current education system. Additionally, it was found that these experiences influenced their perceptions of the teaching profession, so in addition to increasing highly qualified STEM teachers, a focus should also remain on increasing the representation of teachers of color in both teacher preparation programs and K–12 STEM classrooms. By increasing the diversity of our teacher workforce, we can begin to truly examine the inherent racism of public education and work to change it for the better (Brown, 2014; DeCuir & Dixson, 2004; Sleeter, 2016) while also working to increase the representation of people of color in the STEM workforce.

### **Future Work**

The current study investigates the perceptions of different students at three different points in their education journeys, but future research could investigate the same students at different points as part of a longitudinal study. Specifically, this research could evaluate changes in students' perceptions of teaching and of an ideal career as they are exposed to more opportunities for career exploration. Further, this study's analysis only investigated factors of education subgroup and race/ethnicity, but literature suggests that career choices also vary with gender (Eccles, 2005; Eccles, 2011; Eccles & Harold, 1992; Riegler-Crumb et al., 2011; Wang & Degol, 2013), so this

could be further explored. Additional studies could also further explore the identity development of the participants as the findings based on education subgroup indicate that this could help us better understand the vocational choices of adolescents who identify as people of color. Further, because this study's findings suggest that teachers should play a role in recruitment efforts, it would also be valuable to understand how teachers perceive this role and whether there is a difference between teachers who identify as people of color and teachers who identify as white.



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## Appendices

### Appendix 1. Survey

#### *Section 1a: Demographic information (high school)–Please complete the following.*

1. What is your current age?
2. What is your current grade level?
3. Select each grade level in which you attended a Cobb County School  
*List choices for K–11*
4. Please choose the gender with which you identify:  
Male, Female, Other (specify)
5. Please choose the race(s) with which you identify:  
Hispanic, Non–Hispanic
6. Please choose the ethnicity(ies) with which you identify:  
White/Caucasian, Black/African American, Asian, Hispanic/Latinx, Multiple, Other  
(specify)
7. What is your highest recorded ACT math score? (if applicable)
8. What is your highest recorded ACT science score? (if applicable)
9. What is your highest recorded SAT math score? (if applicable)
10. Have you ever taken an AP level math or science course? If so, please list which courses.
11. Will you be the first one in your immediate family to go to college?
12. What major do you intend to complete in college?
13. What career do you currently plan to pursue?
14. Describe the level at which you agree with the following statement, “I have considered teaching as a career.”



*Choices: Strongly disagree, Disagree, Neither, Agree, Strongly Agree*

***Section 1b: Demographic information (college)–Please complete the following.***

1. What is your current age?
2. Please choose which most closely identifies your current standing in college:  
First year, Second or third year (not first or graduating), Graduating year
3. What semester did you first enroll in college?  
*List upcoming semesters to identify standing*
4. What semester do you anticipate graduating from college?  
*List upcoming semesters to identify standing*
5. How many credit hours have you earned thus far in college?  
*List ranges of hours earned*
6. Select each grade level in which you attended a Cobb County School  
*List choices for K–12*
7. Please choose the gender with which you identify:  
Male, Female, Other (specify)
8. Please choose the race(s) with which you identify:  
Hispanic, Non-Hispanic
9. Please choose the ethnicity(ies) with which you identify:  
White/Caucasian, Black/African American, Asian, Hispanic/Latinx, Multiple, Other  
(specify)
10. Are you the first person in your immediate family to go to college?
11. What is your current GPA? (If currently a college freshman, what was your high school GPA?)

12. What is your current major?
13. Have you ever changed your major? If so, what was the original major?
14. What career do you currently plan to pursue?
15. Describe the level at which you agree with the following statement, “I have considered teaching as a career.”

*Choices: Strongly disagree, Disagree, Neither, Agree, Strongly Agree*

### ***Section 2: Perceptions of STEM teachers.***

The following section aims to understand your perceptions of STEM teachers. For each of the following, express the level to which you agree with the statements regarding a career as a STEM teacher. (Adapted from Watt, H. M., & Richardson, P. W. (2007). Motivational factors influencing teaching as a career choice: Development and validation of the FIT–Choice Scale. *The Journal of Experimental Education*, 75(3), 167–202.)

<b><i>Statement: STEM teachers...</i></b>	Not at all	Low	Slightly	Neutral	Moderately	Very	Extremely
	1	2	3	4	5	6	7
Are well paid							
Have a heavy workload							
Earn a good salary							
Are perceived as professionals							
Have high morale							
Have an emotionally demanding job							

Are perceived as having a high–status occupation							
Feel valued by society							
Have high levels of expert knowledge							
Do hard work							
Have a well–respected career							
Feel their occupation has a high social status							
Need high levels of technical knowledge							

### ***Section 3: Perceptions of an ideal career.***

The following section aims to understand your perceptions of your ideal career. (Adapted from Watt, H. M., & Richardson, P. W. (2007). Motivational factors influencing teaching as a career choice: Development and validation of the FIT–Choice Scale. *The Journal of Experimental Education*, 75(3), 167–202.)

1. What is your ideal career?
2. For each of the following, express the level to which you agree with the statements regarding your ideal career.

<b><i>Statement: Individuals in your ideal career...</i></b>	Not at all	Low	Slightly	Neutral	Moderately	Very	Extremely
	1	2	3	4	5	6	7

Are well paid							
Have a heavy workload							
Earn a good salary							
Are perceived as professionals							
Have high morale							
Have an emotionally demanding job							
Are perceived as having a high-status occupation							
Feel valued by society							
Have high levels of expert knowledge							
Do hard work							
Have a well-respected career							
Feel their occupation has a high social status							

Need high levels of technical knowledge							
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**Appendix 2. Interview Protocol*****Phase 1: Before the Interview***

Individual interviews will be conducted

1. Individual interviews will be used to ensure an in–depth understanding of the bounded case being studied as well as for triangulation of the data.
2. After survey data has been collected, 3 to 4 participants will be chosen from each education–level subgroup for an interview. These participants will be chosen using psychobiology purposive sampling in order to ensure that responses are representative of the unique perspectives of people of color within the CRT framework (Palys, 2008; Robinson, 2014) and will provide insight on unique experiences of students who identify as people of color in the chosen Metro Atlanta county. Interviewed participants will be purposefully selected by using gender and race as criterion.
  - a) Each interview will last approximately 90 minutes.
  - b) I will audio record each interview and make notes about demographics so that when transcribed, participant race and gender can be ascribed to the data.Additional investigator notes will be taken as needed during the interviews.
3. Facilitator: The facilitator of the interview will be myself or a KSU professor who is knowledgeable about education as a career as well as the Expectancy Value Theory of career choice and Critical Race Theory as it pertains to institutionalized racism in education (so probe questions can be asked as needed).
4. Location: Interviews for current college students will be conducted at a central location on KSU’s campus that provides comfort but also privacy for the interview. Interviews for

current high school students will be conducted at their local school in a common area that provides comfort but also privacy for the interview.

5. Interview Script:

**Part 1:** Welcome and thank you for your participation today. My name is Ashley Deason, and I am a graduate student at Kennesaw State University conducting a research project for my dissertation study. This study aims to understand perceptions of teaching from students who have demonstrated academic strength in STEM subjects. This interview will last approximately one hour and will contain 10 to 15 questions. I would like your permission to record this interview so I may accurately document the information you convey. If at any time during the interview you wish to discontinue the use of the recorder or the interview itself, please feel free to let me know and we will stop. All of your responses are and will remain confidential, and your responses will only be used for research and educational purposes. Your participation in this interview is completely voluntary. You may also withdraw your participation at any time without consequence. At this time, I would like to ask you for your verbal consent and inform you that your participation in the interview also implies your consent (pause). If at any time you wish to stop or take a break, please let me know. Do you have any questions or concerns before we begin? Then with your permission, we will begin the interview.

**Part 2:** *Ask the questions below and use probes to explore concepts more deeply and as for confirmation of answers as part of simultaneous data analysis.* [All questions were developed from the FIT Choice Survey (Watt & Richardson, 2007) and the critical race theory framework)]

- a) Briefly introduce yourself

- b) What is your current grade level? What are you interested in majoring in in college? (high school only) What is your current year and program of study? (college only)
- c) You said you were/are planning to major in ... What do you plan to do with this degree?
- d) When did you come to decide on this major? Have you ever considered anything else? If you have changed your college major, what led you to do so? (college only)
- e) Do you consider yourself successful in STEM subjects? Why or why not?
- f) What is your ideal career? What led you to this career choice?
- g) What are your perceptions of your ideal career? (i.e. Experts in career? Demanding job? Social Status? Morale? Salary?)
- h) What do you consider to be positive aspects of this ideal career?
- i) What do you consider to be negative aspects of this ideal career?
- j) Have you ever considered teaching as a career? Why or why not?
- k) If you haven't considered teaching, what would make you consider the profession?
- l) What are your perceptions of teaching as a career? (i.e. Experts in career? Demanding job? Social Status? Morale? Salary?)
- m) What do you consider to be positive aspects of the teaching profession?
- n) What do you consider to be negative aspects of the teaching profession?



- o) Who has been your most positively influential teacher? Your most negatively influential teacher? Please describe specific events that illustrate his/her influence on you.
- p) Did your teachers' expectations, attitudes, and actions have an impact on your success in school? What about your success in STEM?
- q) Have you ever had a teacher of color? Did you ever notice a difference between how white teachers treated you and how teachers of color treated you?
- r) Do you think your schooling experiences have influenced your perceptions of teaching as a career choice?
- s) Before we conclude this interview, is there anything else you would like to share?

**Part 3:** Thank you for your time today! You may use this information (e-mail/phone number) to contact me for follow up information if desired. The next steps for me are to analyze your interview responses. This analysis will be in correlation with your responses to the survey to help ensure validity and reliability of the results as well as to better understand how your unique experiences have impacted your perceptions of teaching. Then, I will send this analysis to you to be looked over as part of member checking in order to ensure that your responses have been accurately portrayed in the study.

***Phase 2: Conduct the interviews.***

1. Materials:
  - a) Tape recorder to record proceeding
  - b) Notepad for keeping additional notes / thoughts throughout the interview
  - c) List of participants from interview sign ups
  - d) Script

- e) Watch/clock
- f) Water and refreshments if possible

***Phase 3: Interpreting and reporting the results.***

1. Summarize:
  - a) Write summary of impressions of interview
  - b) Transcribe video recordings using Transcribe software
  - c) Discuss impression with other facilitators if/when possible
2. Analyze: (see body of paper for more details)
  - a) Identify themes/trends from recordings by inserting coding strands using NVivo software
  - b) Analyze interviews by participant demographics (gender, race, ethnicity)
  - c) Open code transcriptions for general themes and patterns in interview responses
  - d) Axial code by using themes/trends that will come from literature based on Expectancy Value Theory identifiers of career choice and Critical Race Theory tenets
  - e) Use selective coding to compare themes/trends between interviews to identify patterns, similarities, and/or differences between developmental age groups, race, and/or ethnicities.
  - f) Have a secondary researcher code a subset of the transcriptions in order to demonstrate interrater reliability
  - g) Send analysis to participants for member checking
3. Interpret: (see body of paper for more details)
  - a) Identify major findings of interviews

- b) Compare findings of interviews to FIT-choice survey results
- c) Draw conclusions, generalizations, and recommendations as appropriate

### Appendix 3. Codebook for Qualitative Data

The tables below show the codes and definitions that were used for the qualitative coding within each framework of the study.

**Table 14**

*Codebook within Expectancy Value Theory*

Code	Definition
Ability	Self-efficacy towards whether a participant felt they would be good at a career
Demand*	Day-to-day aspects of a job that would require some form of cognitive or emotional effort
Expert*	Knowledge of a professional; whether professionals would be considered experts in their field
Interest	Whether or not someone is interested in joining a career and why
Morale*	How happy someone is with their job choice; how happy someone is each day
Personality	Aspects of self that do or do not match with expectations of a career
Salary*	How much a professional is paid for the work they do
Social Status*	How well a person is respected within the community

*Note:* Codes with asterisks (\*) were provisional codes that were determined prior to initial coding.

**Table 15***Codebook within Critical Race Theory*

<b>Code</b>	<b>Definition</b>
Culture	Mention of specific aspects of one's culture
Experience	Specific instances that are referenced as part of counter storytelling
Inclusion	Instances in which the student was or was not included in specific activities
Influence of Teachers	Description of how teachers influenced experiences and perceptions within any given context
Relationships	Mention of relationships with others that influenced experiences and perceptions within any given context
Relevance of Content	Material being learned in school was or was not relevant to the participants' life
Teacher of Color	Specific experiences with a teacher of color
White Teacher	Specific experiences with a white teacher